D-Link DIS-5024T

24-Port 10/100/1000Mbps
Gigabit Ethernet Switch + 2-Port mini GBIC
Web-Smart Switch

User's Guide

V1.01 Edition

D-Link®

Building Networks for People

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ABOUT THIS GUIDE

Congratulations on your purchase of the DIS-5024T 24-Port 10/100/1000Mbps Gigabit Ethernet + 2-Port Mini GBIC Web-Smart Switch. This device integrates 1000Mbps Gigabit Ethernet, 100Mbps Fast Ethernet and 10Mbps Ethernet network capabilities in a highly flexible package.

Purpose

This guide discusses how to install and use the configuration functions of the DIS-5024T Web-Smart Switch.

Terms/Usage

In this guide, the term “Switch” (first letter capitalized) refers to the DIS-5024T Web-Smart Switch, and “switch” (first letter lower case) refers to other Ethernet switches. Some technologies refer to terms “switch”, “bridge” and “switching hubs” interchangeably, and both are commonly accepted for Ethernet switches.

INTRODUCTION

This chapter describes the features of the DIS-5024T and provides some background information about Ethernet/Fast Ethernet/Gigabit Ethernet switching technology.

Gigabit Ethernet Technology

Gigabit Ethernet is an extension of IEEE 802.3 Ethernet utilizing the same packet structure, format, and support for CSMA/CD protocol, full duplex, flow control, and management objects, but with a tenfold increase in theoretical throughput over 100-Mbps Fast Ethernet and a hundredfold increase over 10-Mbps Ethernet. Since it is compatible with all 10-Mbps and 100-Mbps Ethernet environments, Gigabit Ethernet provides a straightforward upgrade without wasting existing investments in hardware, software, and trained personnel.

The increased speed and extra bandwidth offered by Gigabit Ethernet is essential to helping solve network bottlenecks that frequently develop as more advanced computer users and newer applications continue to demand greater network resources. Upgrading key components, such as backbone connections and servers to Gigabit Ethernet technology can greatly improve network response times as well as significantly speed up the traffic between subnets.

Gigabit Ethernet enables fast optical fiber connections to support video conferencing, complex imaging, and similar data-intensive applications. Likewise, since data transfers occur 10 times faster than Fast Ethernet, servers outfitted with Gigabit Ethernet NIC’s are able to perform 10 times the number of operations in the same amount of time.

In addition, the phenomenal bandwidth delivered by Gigabit Ethernet is the most cost-effective method to take advantage of today and tomorrow's rapidly improving switching and routing internetworking technologies. And with expected advances in the coming years in silicon technology and digital signal processing that will enable Gigabit Ethernet to eventually operate over unshielded twisted-pair (UTP) cabling, outfitting your network with a powerful 1000-Mbps-capable backbone/server connection creates a flexible foundation for the next generation of network technology products.

Fast Ethernet Technology

The growing importance of LANs and the increasing complexity of desktop computing applications are fueling the need for high performance networks. A number of high-speed LAN technologies have been proposed to provide greater bandwidth and improve client/server response times. Among them, 100BASE-T (Fast Ethernet) provides a non-disruptive, smooth evolution from the current 10BASE-T technology. The non-disruptive and smooth evolution nature, and the dominating potential market base, virtually guarantees cost-effective and high performance Fast Ethernet solutions.

100Mbps Fast Ethernet is a standard specified by the IEEE 802.3 LAN committee. It is an extension of the 10Mbps Ethernet standard with the ability to transmit and receive data at 100Mbps, while maintaining the CSMA/CD Ethernet protocol. Since the 100Mbps Fast Ethernet is compatible with all other 10Mbps Ethernet environments, it provides a straightforward upgrade and utilizes existing investments in hardware, software, and personnel training.

Switching Technology

Another approach to pushing beyond the limits of Ethernet technology is the development of switching technology. A switch bridges Ethernet packets at the MAC address level of the Ethernet protocol transmitting among connected Ethernet or Fast Ethernet LAN segments.

Switching is a cost-effective way of increasing the total network capacity available to users on a local area network. A switch increases capacity and decreases network loading by dividing a local area network into different segments, which don't compete with each other for network transmission capacity.

The switch acts as a high-speed selective bridge between the individual segments. The switch, without interfering with any other segments, automatically forwards traffic that needs to go from one segment to another. By doing this the total network capacity is multiplied, while still maintaining the same network cabling and adapter cards.

IEEE 802.1Q VLAN

A Virtual Local Area Network (VLAN) is a group of end-stations that are not constrained by their physical location and can communicate as if located on a common broadcast domain, or a LAN. The primary utility of using VLAN is to reduce latency and need for routers, in favor of using faster switching technologies instead. The IEEE 802.1Q specification provides a standard for tagging Ethernet frames with VLAN membership information. The 802.1Q standard is intended to address the problem of how to break large networks into smaller parts

so broadcast and multicast traffic use valuable network bandwidth more efficiently. Additional VLAN benefits include:

Security: Security is increased with the reduction of opportunity in eavesdropping on a broadcast network because data will be switched to only those confidential users within the VLAN.

Cost Reduction: VLANs can be used to create multiple broadcast domains, thus eliminating the need of expensive routers.

VID: VLAN ID is an identification of up to 4094 possible VLANs. A VID of 0 is used to identify priority frames. The value 4095 (FFF) is reserved, so the maximum possible VLAN configurations are 4,094.

Features

- Address Table: Supports up to 8K MAC address per device
- Supports a packet buffer of up to 512K Bytes
- Supports Jumbo frame setting
- IGMP Snooping support
- IEEE802.1D Spanning Tree
- Support static Port Trunk
- IEEE802.3x flow control in full duplex mode
- Port Mirroring support
- IEEE802.1Q VLAN
- Asymmetric VLAN
- IEEE802.1p Priority Queues
- IEEE802.1x Port-based Access Control

- Supports Broadcast Storm Control
- IP-MAC-Port Binding
- Supports Static MAC setting
- D-Link Safeguard Engine support
- Supports Simple Network Management Protocol(SNMP)
- MIB support for: RFC1213 MIB II, Private MIB
- Supports DHCP client
- Supports Port -setting for Speed and Flow control
- Easy configuration via Web Browser
- Easy setting via Web Management Utility
- Firmware backup and upload via Web GUI
- System reboot via Web GUI
- Provides parallel LED display for port status such as link/act, speed, etc.

Technical Specifications

Key Components / Performance	
Switching Capacity	48Gbps
Max. Forwarding Rate	10M: 14,880 pps 100M: 148,809 pps 1G: 1,488,095 pps
Forwarding Mode	Store and Forward

Packet Buffer memory	512K Bytes
SDRAM for CPU	8M Bytes
Flash Memory	Prom 2M Bytes
Port Functions	
LAN	- 24 x 10/100/1000BaseT ports - Compliant with the following standards: IEEE 802.3 compliance 1. IEEE 802.3u compliance 2. IEEE 802.3ab compliance 3. Supports Full-Duplex operations at 10/100Mbps, and 1000Mbps only on SFP ports 4. IEEE 802.3x Flow Control support for Full-Duplex mode
Combo ports in the front panel	- 2 x SFP ports combined with Port 23 and Port24 - SFP Transceivers Supported: 1. DEM-310GT (1000BASE-LX), up to 10km 2. DEM-311GT (1000BASE-SX), up to 550m 3. DEM-314GT (1000BASE-LH), up to 50km 4. DEM-315GT (1000BASE-ZX), up to 80km - Compliant to following standards: IEEE 802.3z compliance
Chassis	

Dimensions	19-inch, 1U Rack-mount size 440mm x 210mm x 44mm
Reset button on the back panel	A factory reset button x 1
Physical & Environment	
AC input	100-240 VAC, 50/60Hz Internal universal power supply
Operation Temperature	0-40°C
Storage Temperature	-10-70°C
Humidity	Operation: 10%-90% RH Storage: 5% ~ 90% RH
Power consumption	35.1(watts)
Heat Dissipation	119.69 (btu/hr)
MTBF	155456 (hours)
Emission (EMI) and Safety Certifications	
EMI-EMC Compliance: FCC class A, CE Class A, VCCI Class A Safety Compliance: cUL, UL	

UNPACKING AND INSTALLATION

This chapter provides unpacking and installation information for the Web-Smart Switch.

Unpacking

Carefully unpack the contents of the Web-Smart Switch packaging and locate the following items:

One DIS-5024T Web-Smart Switch

One AC power cord, suitable for the local electrical power voltage requirements

Four rubber feet to be used for shock cushioning

Screws and two mounting brackets

CD-Rom with the SmartConsole Utility application , User's Guide

And Quick Installation Guide

If any item is found missing or damaged, please contact the reseller for replacement.

Installation

The site chosen for installation greatly affects the Web-Smart Switch's performance. When installing, consider the following points:

- Install the Switch in a fairly cool and dry place. See ***Technical Specifications*** for the acceptable temperature and humidity operating ranges.

- Install the Switch in a site free from strong electromagnetic field generators (such as motors), vibration, dust, and direct exposure to sunlight.
- Leave at least 10cm of space to the front and rear of the Switch for ventilation.
- Install the Switch on a sturdy, level surface that can support its weight, or in an EIA standard-size equipment rack. For information on rack installation, see the next section, ***Rack Mounting***.
- When installing the Switch on a level surface, attach the rubber pads (feet) to the bottom. The rubber feet cushion the switch and helps protect the case from scratches.

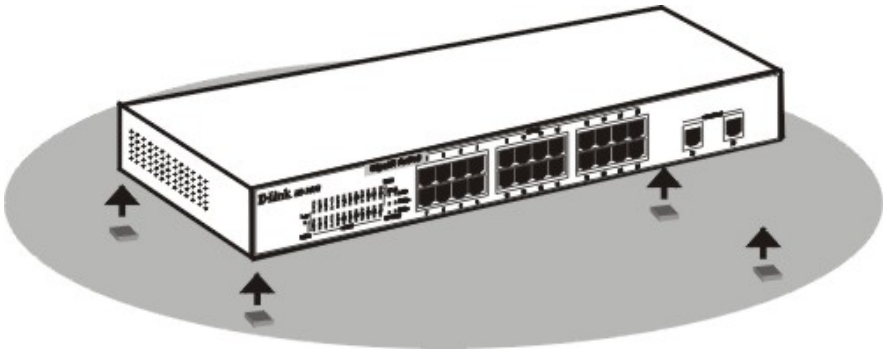


Figure 1 – Attach the adhesive rubber pads to the bottom

Rack Mounting

The Switch can be mounted in an EIA standard-size, 19-inch rack or chassis, which can be located in a wiring closet with other equipment. Attach the mounting brackets to the Switch's side panels (one on each side), and secure them with the provided screws.

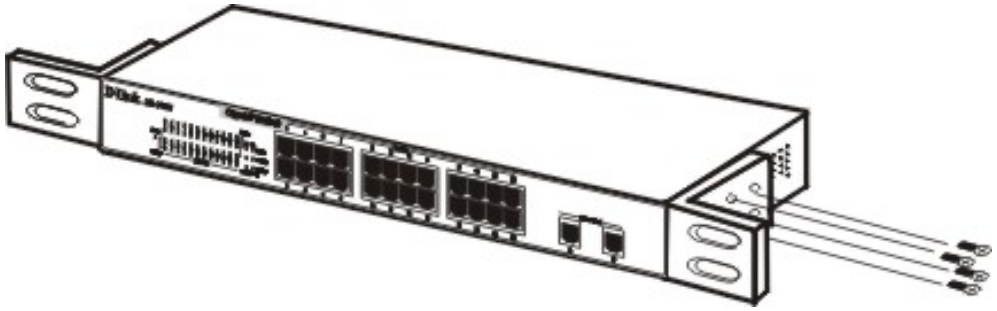


Figure 2 – Attach the mounting brackets to the Switch

Use the screws provided with the equipment rack or chassis to mount the Switch in the rack.

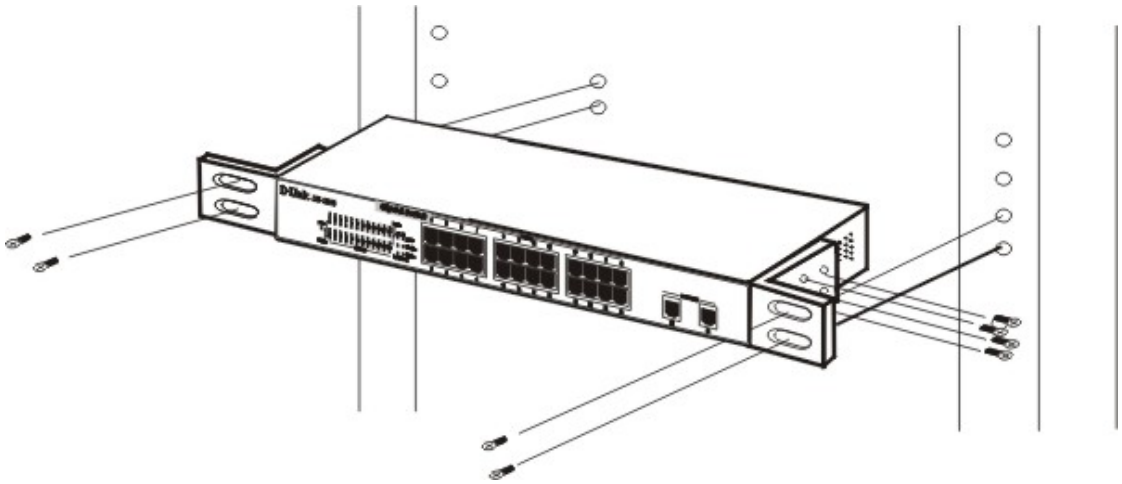


Figure 3 – Mount the Switch in the rack or chassis

Connecting Network Cable

The Switch supports 1000Mbps Gigabit Ethernet that can operate in Auto-negotiate mode, and 10Mbps Ethernet or 100Mbps Fast Ethernet modes that run both in half and full duplex modes, as well as 1000Mbps Gigabit Ethernet that runs in full duplex mode, all while connected to four-pair Category 5 Cables.

The twenty four RJ-45 ports are all Auto-MDI type ports. The Switch can auto transform to MDI-II or MDI-X type, therefore connections with standard or crossover RJ45 cables are both supported.

AC Power

The Switch utilizes an AC power supply of 100-240V AC, 50-60 Hz. The power switch is located at the rear of the Switch adjacent to the AC power connector and the system fan. The switch's power supply will adjust to the local power source automatically and may be turned on without having any or all LAN segment cables connected.

IDENTIFYING EXTERNAL COMPONENTS

This chapter describes the front panel, rear panel, and LED indicators of the Switch.

Front Panel

The figure below shows the front panel of the Switch.

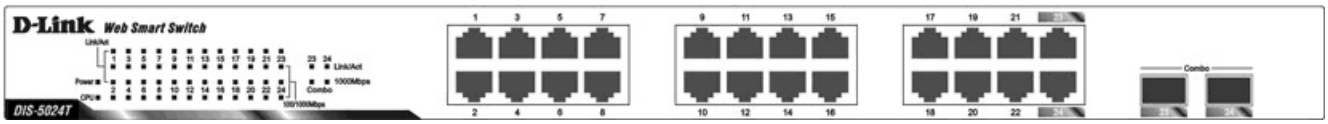


Figure 4 – Front panel of the 24-port Web-Smart Switch

LED Indicator:

Comprehensive LED indicators display the status of the switch and the network (see the ***Understanding LED Indicators*** section).

Gigabit Ethernet Ports (Port 1~24):

The Switch includes twenty four Gigabit twisted pair ports, each supporting auto negotiable 10/100/1000Mbps and auto MDI/MDIX crossover detection functions. This function provides true “plug and play” capability. These ports can operate in half-duplex mode for 10/100Mbps and full-duplex mode for 10/100/1000Mbps.

Mini GBIC Ports(Option Port 23~24)

The Switch is equipped with two mini-GBIC ports, supporting an optional 1000BASE-SX/LX mini-GBIC module.

Note: When a port is set to “Forced Mode”, the Auto MDI/MDIX will be disabled.

Rear Panel

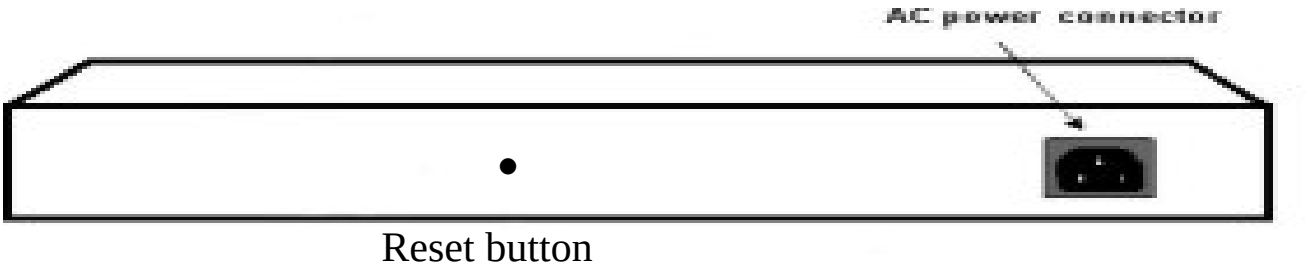


Figure 5 – Rear panel of the Switch

Reset button: The Reset button resets all configuration settings back to the factory default.

Note: Be sure that to record all custom settings of the Switch before pressing the reset button. Resetting the Switch back to factory default settings will erase all custom configurations.

AC Power Connector: Plug in the female connector of the provided power cord into this connector, and the male into a power outlet. Supported input voltages range from 100-240V AC, and 50-60Hz.

UNDERSTANDING LED INDICATORS

The front panel's LED Indicators provide instant status feedback, which help monitoring and troubleshooting LAN issues if needed.

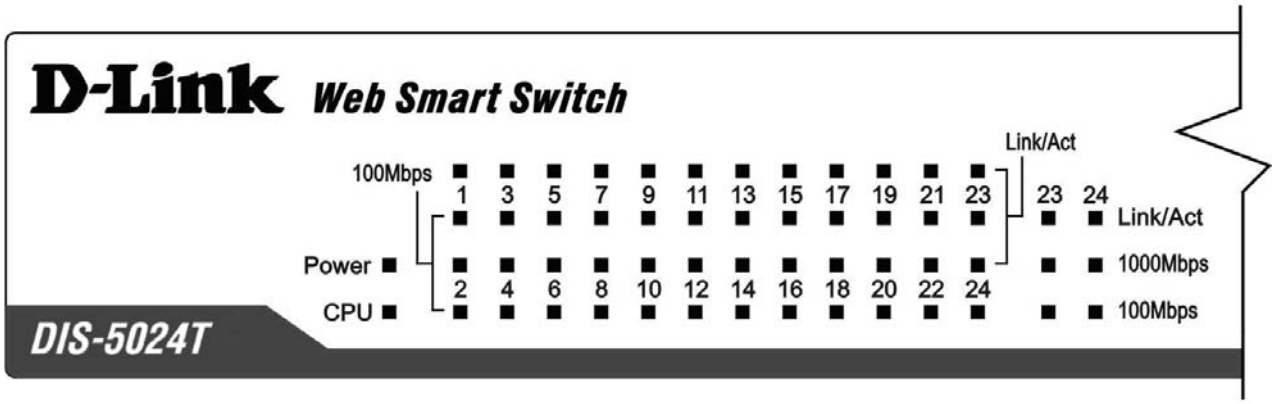


Figure 6 – LED indicators of the Switch

Power and System LEDs

Location	LED Indicative	Color	Status	Description
Per Device	Power	Green	Solid Light	Power is On
			Light off	Power is Off
	System	Green	Blinking	When the CPU is working, the System LED will blink
			On/Off	The CPU is not working
LED Per 10/100/ 1000 Mbps Port	Link/Act	Green	Solid Light	When there is a secure connection (or link) to an Ethernet device in any of the ports

			Blinking	When there is reception or transmission (or Activity) of data in any port
			Light off	No link detected
	Speed	Green	Solid Light	When there is a secure connection (or link) to 1000Mbps device in a port
		Amber	Solid Light	When there is a secure connection (or link) to 100Mbps device in any of the ports
		Off	Light off	Possible link at 10M or no link
LED Per SFP Port	Link/Act	Green	Solid Light	When there is a secure connection (or link) to Ethernet device in any of the ports
			Blinking	When there is reception or transmission (or Activity) of data occurring in a port
			Light off	No link
	1000Mbps	Green	Solid Light	When there is a secure connection (or link) to a 1000Mbps device in any of the ports
		Off	Light off	No link

CONFIGURATION

Through a web browser, the features and functions of the DIS-5024T Switch can be configured for optimum use.

Supported web browsers

The embedded Web-based Utility currently supports the following web browsers:

- Microsoft Internet Explorer ver. 6.0, 5.5
- Mozilla ver. 1.7.12, 1.6
- Firefox ver. 1.5, 1.0.7
- Netscape ver. 8.0.4, 7.2
- Opera ver. 8.5, 7.6
- Safari ver. 2.0.2

Installing the SmartConsole Utility

The following instructions provide guidance to install the SmartConsole Utility.

1. Insert the Utility CD in the CD-Rom Drive.
2. From the **Start** menu on the Windows desktop, choose **Run**.
3. In the **Run** dialog box, type D:\SmartConsole Utility\setup.exe (D:\ depends where your CD-Rom drive is located) and click **OK**.
4. Follow the on-screen instructions to install the utility program.
5. Upon completion, go to **Program Files -> SmartConsole Utility** and execute the SmartConsole Utility.

SmartConsole Utility Features

The SmartConsole Utility is divided into four parts, a ***Menu Toolbar*** of functions at the top, ***Discovery List***, ***Monitor List***, and ***Device Setting***.

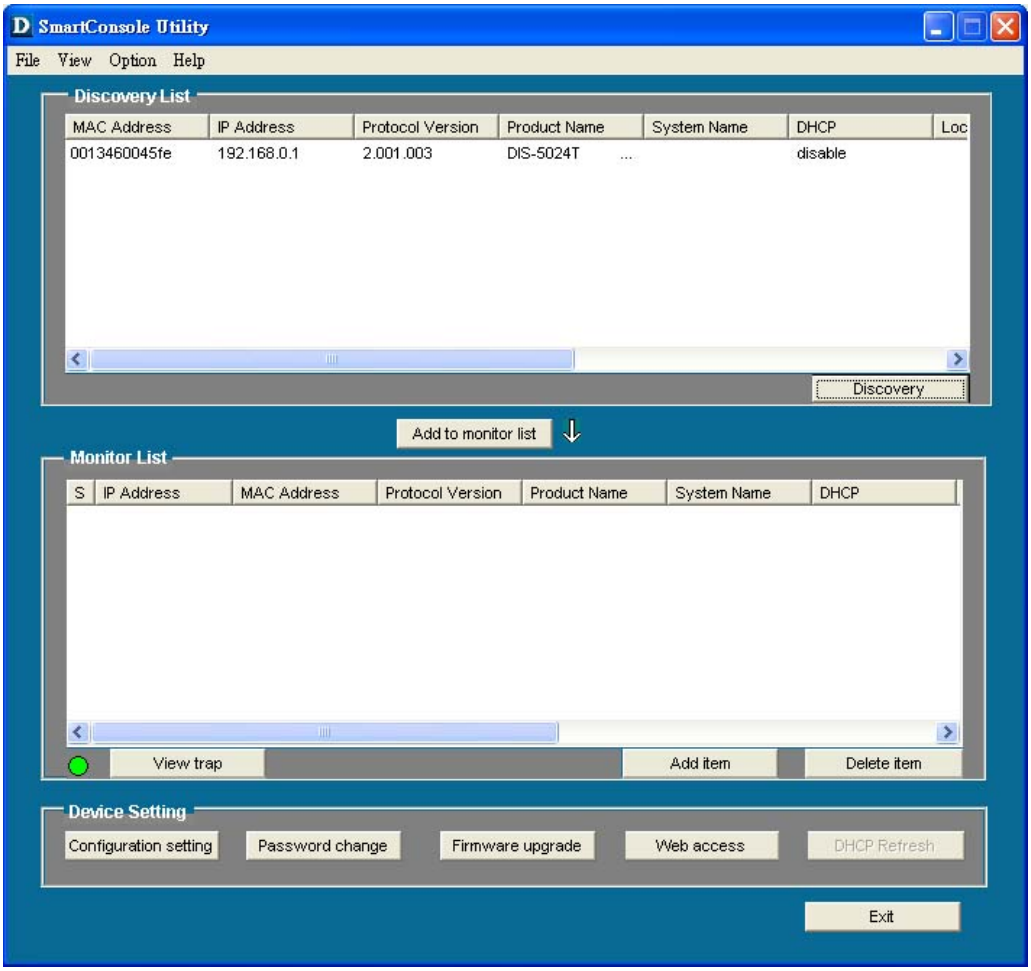


Figure 7 – SmartConsole Utility

Menu Toolbar

The Menu Toolbar in the SmartConsole Utility has four main tabs, File, View, Option, and Help.

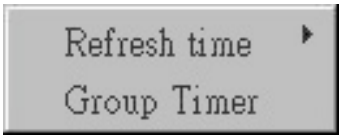
File includes: *Monitor save*, *Monitor save as*, *Monitor load* and *Exit*.

- **Monitor Save:** To record the setting of the Monitor List as default for the next time the SmartConsole Utility is used.
- **Monitor Save As:** To record the setting of the Monitor List in an appointed filename and file path.
- **Monitor Load:** To manually load a Monitor List setting file.
- **Exit:** To exit the SmartConsole Utility.

View includes: *View log* and *Clear Log* functions, which provide trap setting list operations.

- **View Log:** To show the event of the SmartConsole Utility and the device.
- **Clear Log:** To clear all log entries.

Option includes: *Refresh Time* and *Group Timer* functions.



- **Refresh time** refreshes the monitoring time of the device. Choices include ***15 secs, 30 secs, 1 min, 2 min and 5 min*** for selecting the monitoring time intervals.

- **Group Timer** establishes the intervals (in seconds) that the Web-Smart Switch will be discovered in the SmartConsole Utility Discovery List.

NOTE: If the Group Timer is set to 0, IGMP snooping must be disabled or else the Web-Smart Switch will not be discovered.

Help includes: information *About* the SmartConsole Utility, such as the software version.

Discovery List

This is the list where all Web-Smart devices on the network are discovered.

By pressing the **Discovery** button, all the Web-Smart devices are listed in the discovery list.

Double click or press the **Add to monitor list** button to select a device from the Discovery List to the Monitor List.

Definitions of the Discovery List features:

MAC Address: Shows the device MAC Address.

IP Address: Shows the current IP addresses of devices.

Protocol version: Shows the version of the Utility protocol.

Product Name: Shows the device product name.

System Name: Shows the appointed device system name.

DHCP: uses a client/server model to obtain lease of an IP address from a DHCP server as part of the network boot process.

Location: Shows where the appointed device location.

Trap IP: Shows the IP where the Trap information will be sent.

Subnet Mask: Shows the Subnet Mask set of the device.

Gateway: Shows the Gateway set of the device.

Monitor List

All Web-Smart devices in the Monitor List can be monitored, with Trap information available to be received for monitoring status information of the device.

Definitions of the Monitor List functions and terms:

S: Shows the system symbol of the Web-Smart device, represents the device system is inactive.

IP Address: Shows the current IP address of the device.

MAC Address: Shows the device MAC Address.

Protocol version: Shows the version of the Utility protocol.

Product Name: Shows the device product name.

System Name: Shows the appointed device system name.

DHCP: uses a client/server model to obtain lease of an IP address from a DHCP server as part of the network boot process.

Location: Shows where the device is located.

Trap IP: Shows the IP where the Trap to be sent.

Subnet Mask: Shows the Subnet Mask set of the device.

Gateway: Shows the Gateway set of the device.

View Trap: The Trap function works to receive the events configured in the Web-Smart Switch from the Monitor List.

There is a light indicator following the ***"View Trap"*** button. When the light indicates in green, no new traps are available. When red, a new trap indicates a new trap is available. (Figure 8)

Figure 8 – View trap

When the ***"View Trap"*** button is clicked, a Trap Information window will pop up, showing the trap information, such as Symbol, Time, Device IP and the Event occurred. (Figure 9)

The symbol " " represents a new trap signal, and will disappear after the event record is reviewed (clicked).

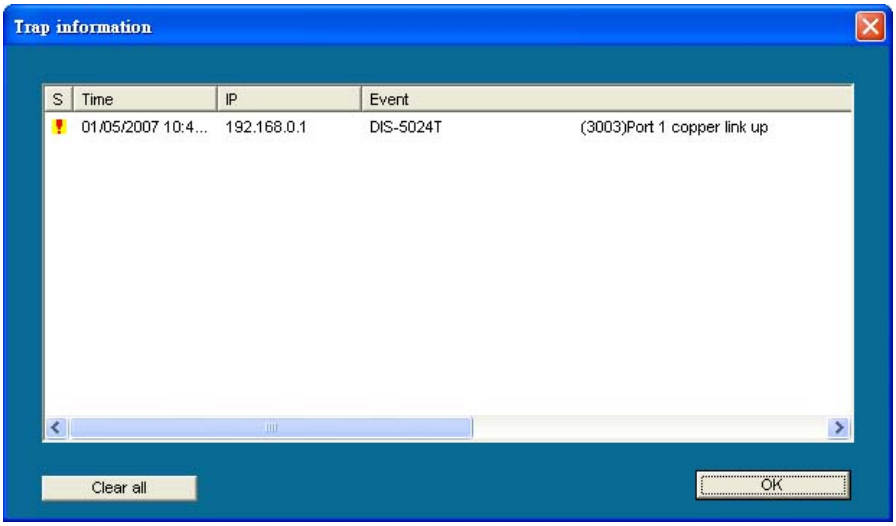


Figure 9 – Trap information

Note: To receive Trap information, the switch must be configured with Trap IP and Trap Events, available from the Trap Setting menu.

Add Item: Adds a device to the Monitor List manually, by entering the IP Address of the device to monitor.

Delete Item: Deletes the device from the Monitor List.

Device Setting

Function buttons of the Device Setting section provide several options.

Configuration Setting: In the Configuration Setting, the following settings are available: Product Name, MAC Address, IP Address, Subnet Mask, Gateway, Set Trap to (Trapping IP Address), System name, Location, Password and DHCP ON/OFF (OFF is default).

After selecting the device from the Discovery List or Monitor List and pressing Configuration Setting, modify the information necessary and press "Set".

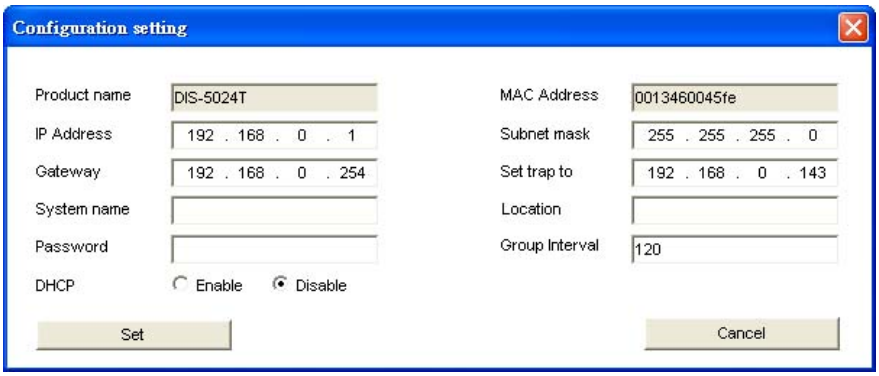


Figure 10 – Configuration Setting

Password Change: To change the password, fill in the new and original password, and press ***"Set"***.

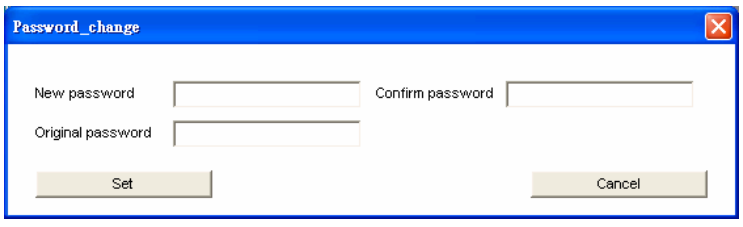


Figure 11 – Password Change

This space has been intentionally reserved for notes:

Firmware Upgrade: When the device firmware is be upgraded, enter the Firmware path and password (if necessary) to update.

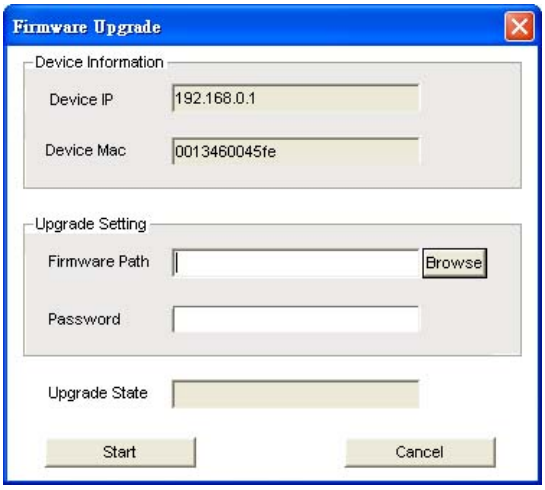


Figure 12 – Firmware Upgrade

Web Access: Double click the device in the Monitor List or select a device in the Monitor List and press the ***"Web Access"*** button to open the Web-based Utility. To see the list of web browsers the Web-based Utility supports, see ***Supported web browsers*** on page 20.

DHCP Refresh: select a device in the Monitor List and press the "**DHCP Refresh**", and enter the password (if applicable) to trigger the Web-Smart Switch to request an IP address from a DHCP Server.

Figure 13 – DHCP Refresh

Web-based Utility

The DIS-5024T Web-Smart Switch has a web browser GUI interface for configuring the Switch through a web browser. To see the list of web browsers the Web-based Utility supports, see ***Supported web browsers*** on page 20. A network administrator can manage, control and monitor the Switch from a PC on the local LAN. This section describes how to operate the functions found in the Web-based Utility.

Login

Before beginning to configure the Web-Smart Switch through a web browser over an Ethernet connection, the PC used to manage the Switch must reside on the same the IP network. By default, the Switch automatically obtains an IP address from a DHCP Server. The admin configuring the Switch must check the LAN's DHCP Server to identify the IP Address assigned to the Switch. The default IP address is 192.168.0.1 if the Switch cannot successfully obtain an IP address from a DHCP Server. If the DHCP assigned IP address of the Web-Smart Switch is 192.168.0.1, then the managing PC should use 192.168.0.x (where x is a number between 2 and 254) as its IP address, with a subnet mask also being the same (255.255.255.0 if not assigned by a DHCP Server). To begin, open a supported web browser and enter the IP address of the Switch (ex http://192.168.0.1).

Figure 14 – Logging into the Switch's (DHCP assigned) IP address

Alternatively, through the SmartConsole Utility, when the Switch is discovered, select the device shown in the Monitor List of the SmartConsole Utility to open the device in a web browser.

When the following dialog appears, (the actual IP address will correspond with the IP address of the Switch), enter the default password ***"admin"*** and press OK to enter the main Web-based Utility.

Figure 15 – Log in screen

After entering the password, the main page of the Web-based Utility displays the status of the Switch. In the top right corner the *user name* (default 'admin') is displayed with the *IP address* of the Switch. Below this is a ***Logout*** option for use when the session is complete.

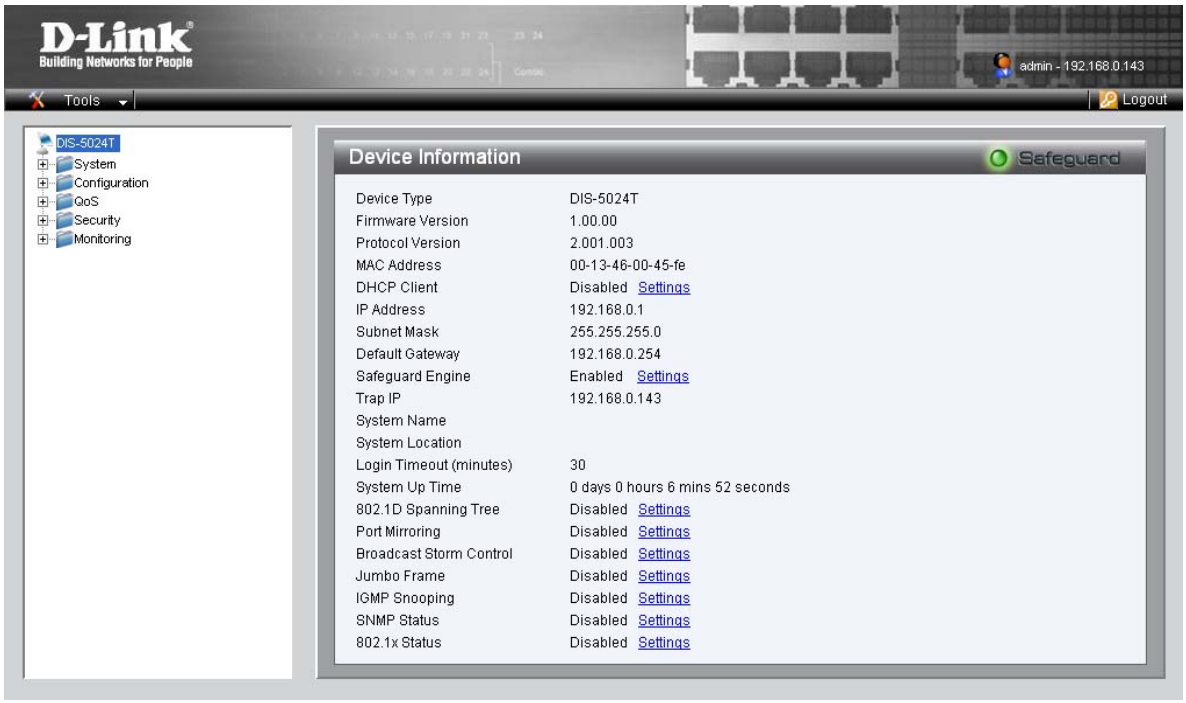


Figure 16 – Device Status

Tool Menu

The Tool Menu offers global function controls such as Reset, Configuring Backup and Restoration, Firmware Backup and Upload, and System Reboot.

Figure 17 – Tool Menu

Reset: Provides a safe reset option for the Switch.

Factory Reset
Safeguard
Please be aware that Factory Reset will reset all settings to their default values.
Factory Reset

Figure 18 – Tool Menu > Reset

Configure Backup and Restore: Allows the current configuration settings to be saved to a file (not including the password), and if necessary, to be restored from a backup.

Figure 19 – Tool Menu > Configure Backup and Restore

Firmware Backup and Upload: Allows for the firmware to be saved, or for an existing firmware file to be uploaded to the Switch.

Figure 20 – Tool Menu > Firmware Backup and Upload

System Reboot: Provides a safe way to reboot the system.

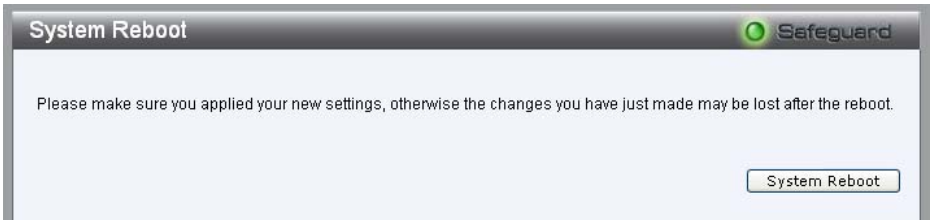

System Reboot
Safeguard
Please make sure you applied your new settings, otherwise the changes you have just made may be lost after the reboot.
System Reboot

Figure 21 – Tool Menu > System Reboot

Setup Menu

When the Web-based Utility appears, a ***Setup Menu*** on the left side of the screen provides an organization of links to pages for specific feature and function configurations and properties. The following sections describe in more detail each of the features and functions.

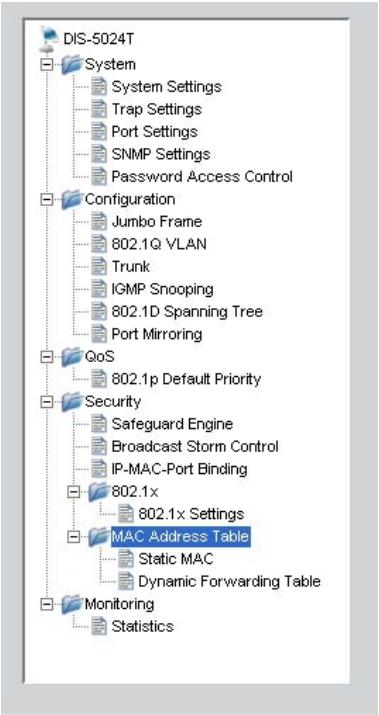


Figure 22 – Setup Menu

System > System Setting

The System Setting includes IP Information and System information. By default DHCP is disabled. If DHCP is disabled, the **IP Address**, **Subnet Mask** and **Gateway** can be manually configured. By entering a **System Name** and **System Location**, the device can more easily be recognized through the SmartConsole Utility and in other Web-Smart devices on the LAN. The **Login Timeout** controls the idle time-out for security purposes, when there is no action in the Web-based Utility. When the Login Timeout expires, the Web-based Utility requires a re-login before using the Utility again.

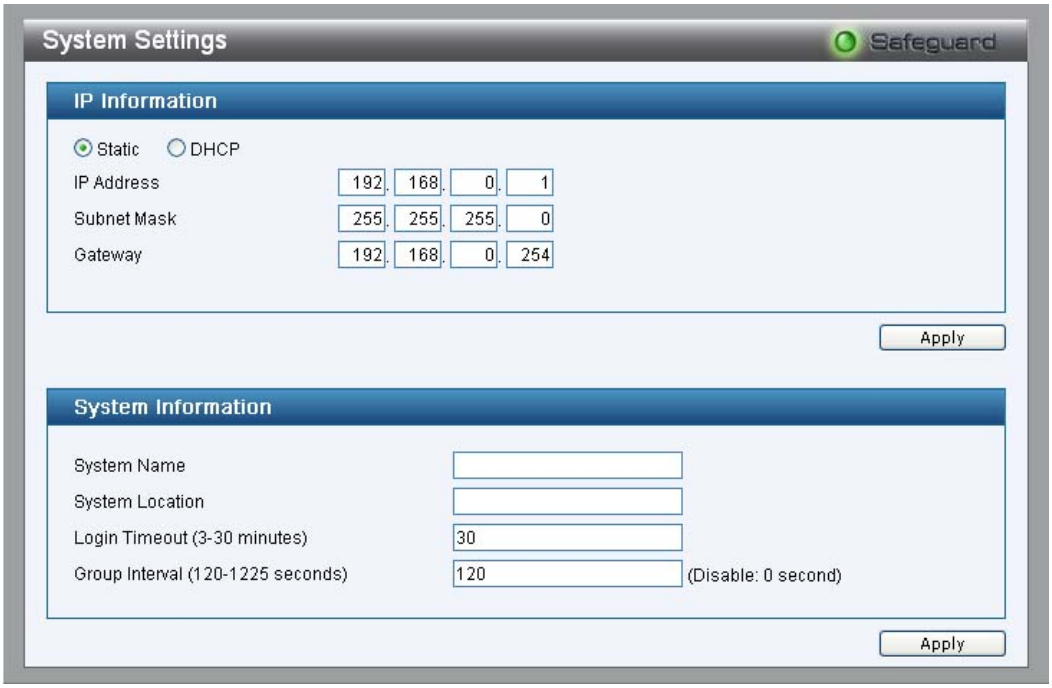


Figure 23 – System > System Setting

System > Trap Setting

A Trap Setting allows the Web-Smart Switch to monitor Trap information through the Web-based Utility of an IP address on the LAN. By default, Trap Setting is ***Disabled***. When the Trap Setting is

Enabled, enter the **Destination IP** address of the managing PC that will receive trap information.

Figure 24 – System > Trap Setting

System Event: Monitors the system's trapping information.

Device Bootup: Traps system boot-up information.

Illegal Login: Traps events of incorrect password logins, recording the IP of the originating PC.

Fiber Port Events: Monitors the fiber port status.

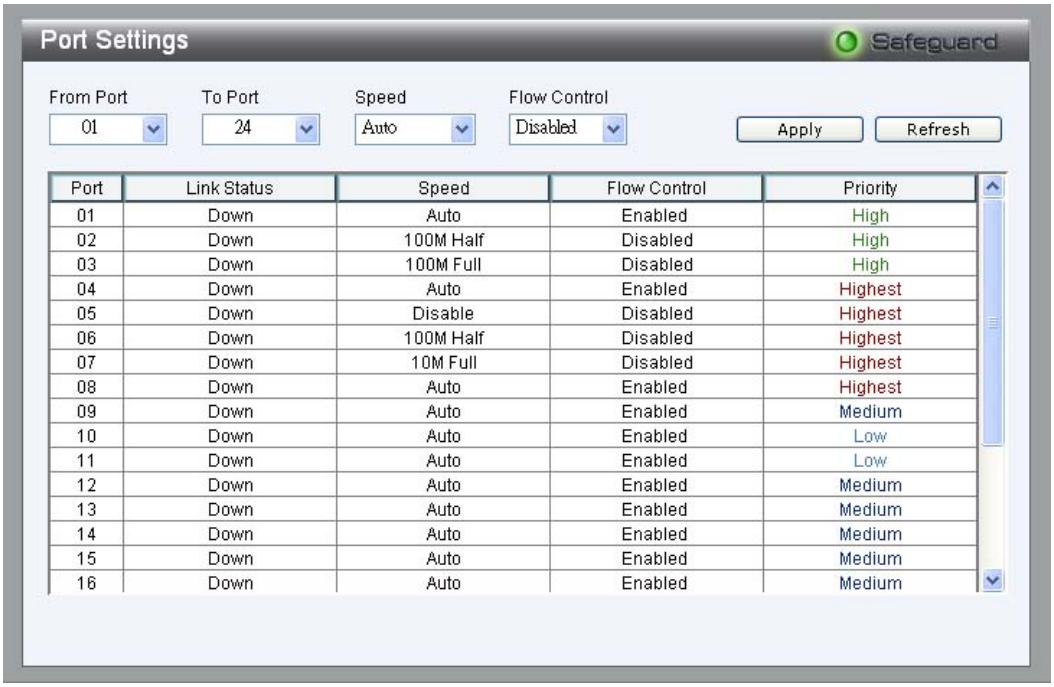
Link Up/Link Down: Traps fiber connection information.

Twisted pair Port Events: Monitors the copper cable port status.

Link Up/Link Down: Traps copper connection information.

System > Port Setting

In the Port Setting page, the status of all ports can be monitored and adjusted for optimum configuration. By selecting a range of ports (**From Port** and **To Port**), the **Speed** and **Flow Control** can be set for all such ports, by clicking **Apply**. To refresh the information table to view the latest Link Status and Priority, press the **Refresh** button.



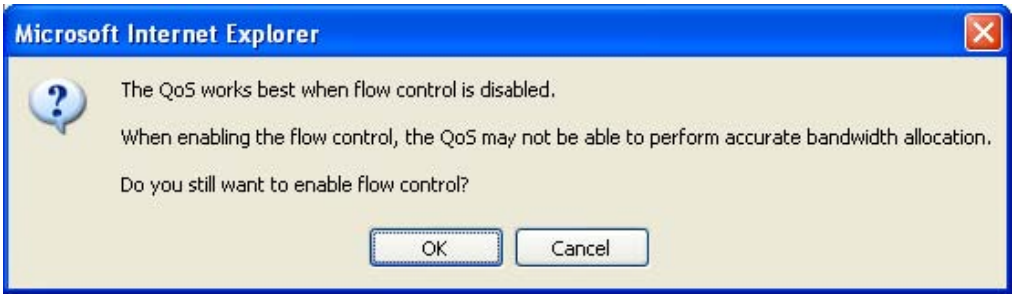
Port	Link Status	Speed	Flow Control	Priority
01	Down	Auto	Enabled	High
02	Down	100M Half	Disabled	High
03	Down	100M Full	Disabled	High
04	Down	Auto	Enabled	Highest
05	Down	Disable	Disabled	Highest
06	Down	100M Half	Disabled	Highest
07	Down	10M Full	Disabled	Highest
08	Down	Auto	Enabled	Highest
09	Down	Auto	Enabled	Medium
10	Down	Auto	Enabled	Low
11	Down	Auto	Enabled	Low
12	Down	Auto	Enabled	Medium
13	Down	Auto	Enabled	Medium
14	Down	Auto	Enabled	Medium
15	Down	Auto	Enabled	Medium
16	Down	Auto	Enabled	Medium

Figure 25 – System > Port Setting

Speed: Fiber connections can operate in Forced Mode settings (1000M Full), Auto, or Disable. Copper connections can operate in Forced Mode settings (100M Full, 100M Half, 10M Full, 10M Half), Auto, or Disable. The default setting for all ports is *Auto*.

NOTE: Be sure to adjust port speed settings appropriately after changing connected cable media types .

Flow Control: This setting determines if the Switch handles flow control. Set to *Enable* to avoid data transfer overflows. Default setting for all ports is *Disable*.


Microsoft Internet Explorer
The QoS works best when flow control is disabled.
When enabling the flow control, the QoS may not be able to perform accurate bandwidth allocation.
Do you still want to enable flow control?
OK
Cancel

NOTE: When user enable flow control at the first time, the message will pop up.

Link Status: Reporting *Down* indicates the port is disconnected.

Priority: Displays each port's 802.1P QoS priority level for received data packet handling. Default setting for all ports is *Middle*.

NOTE: The priority of Gigabit Fiber ports are by default higher than Copper ports.

System > SNMP Setting

Simple Network Management Protocol (SNMP) is an OSI Layer 7 (Application Layer) designed specifically for managing and monitoring network devices. SNMP enables network management stations to read and modify the settings of gateways, routers, switches, and other network devices. Use SNMP to configure system features for proper operation, monitor performance and detect potential problems in the Switch or LAN.

Managed devices that support SNMP include software (referred to as an agent), which runs locally on the device. A defined set of variables (managed objects) is maintained by the SNMP agent and used to manage the device. These objects are defined in a Management Information Base (MIB), which provides a standard presentation of

the information controlled by the on-board SNMP agent. SNMP defines both the format of the MIB specifications and the protocol used to access this information over the network.

Community Setting: In support of SNMP version 1, the Web-Smart Switch accomplishes user authentication by using Community Settings that function as passwords. The remote user SNMP application and the Switch SNMP must use the same community string. SNMP packets from a station that are not authenticated are ignored (dropped).

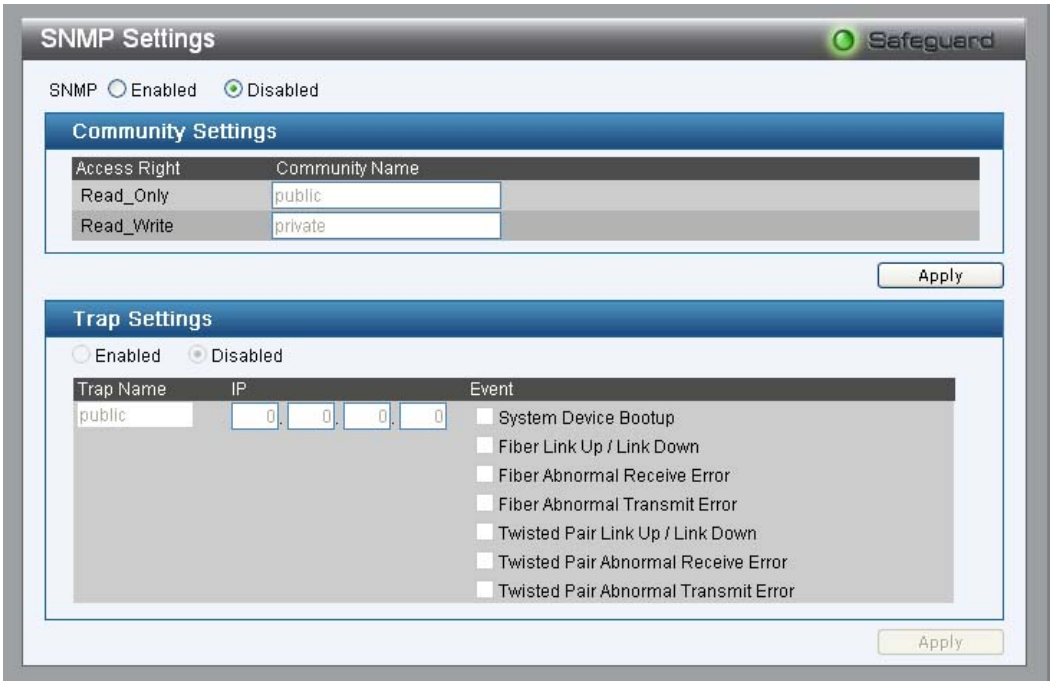


Figure 26 – System > SNMP Setting

Enabled / Disabled: Default setting is *Disabled*. Click *Enable*, then *Apply*, to set Community Settings.

The default community strings for the Switch used for SNMP v.1 management access are:

> **Public:** The community with read-only privilege allows authorized management stations to retrieve MIB objects.

Private: The community with read/write privilege allows authorized management stations to retrieve and modify MIB objects.

Trap Setting: Traps are messages that alert network personnel of events that occur on the Switch. Such events can be as serious as a reboot (someone accidentally turned the Switch OFF), or less serious events such as a port status change. The Switch can generate traps and send them to the trap recipient (i.e. network administrator).

Setting up a Trap: Select *Enable*, enter a Trap Name (i.e. Trap Name must be selected from a Community Name), add the IP of the device to be monitored, and choose the event(s) to trap. The available trap Events to choose from include: System Device Bootup, Fiber Link Up / Link Down, Fiber Abnormal Receive Error, Fiber Abnormal Transmit Error, Twisted Pair Link Up / Link Down, Twisted Pair Abnormal Receive Error, Twisted Pair Abnormal Transmit Error.

System > Password Access Control

Setting a password is a critical tool for managers to secure the Web-Smart Switch. After entering the old password and the new password two times, press Apply for changes to take effect.

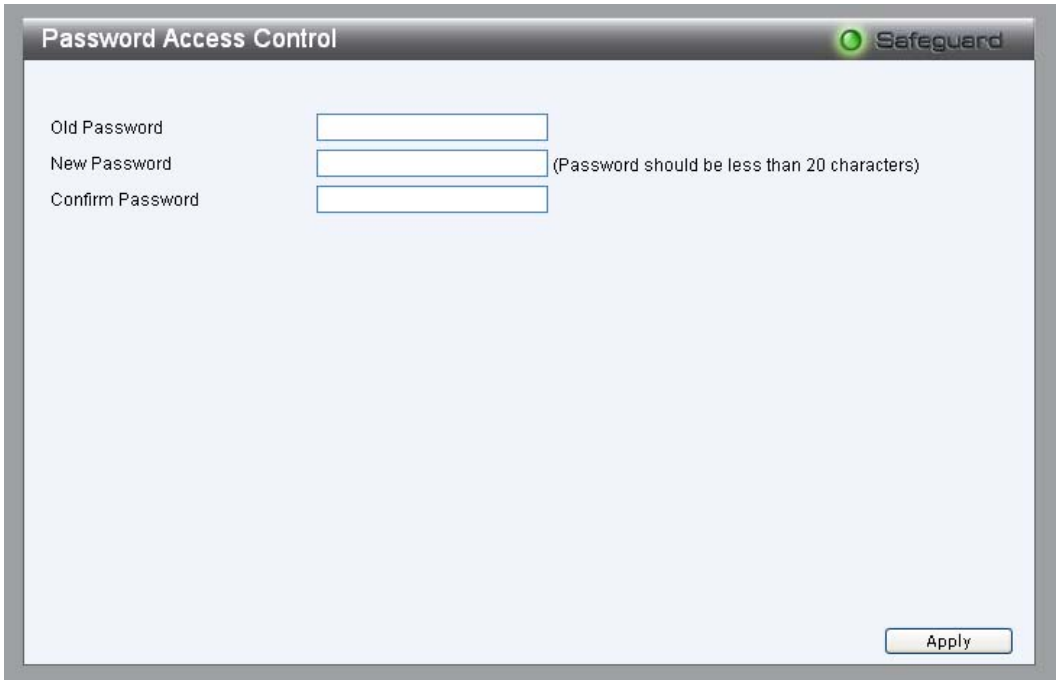


Figure 27 – System > Password Access Control

Configuration > Jumbo Frame

By default, the Jumbo Frame function is set to Disabled. Enabling this function will allow the Switch to receive packets sizes of up to 10,240 bytes.

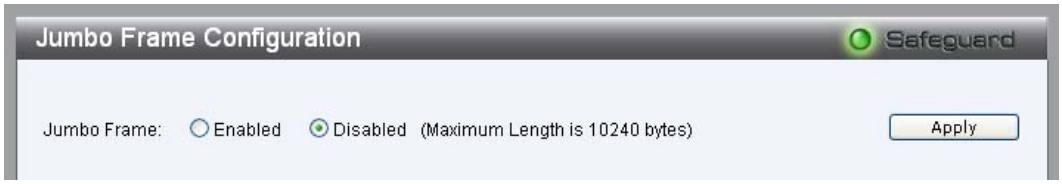


Figure 28 – Configuration > Jumbo Frame

Configuration > 802.1Q VLAN

The IEEE 802.1Q VLAN Configuration page provides powerful VID management functions. By default, VID is 01, is named “default”, and includes all 24 ports as “Untagged” (see Figure 29).

Rename: Press to rename the VLAN group.

Delete VID: Press to delete the VLAN group.

Add New VID: Press to create a new VID group, assigning ports from 01 to 24 as *Untag*, *Tag*, or *Not Member*. A port can be “Untagged” in only one VID. To save the VID group, press ***Apply***.

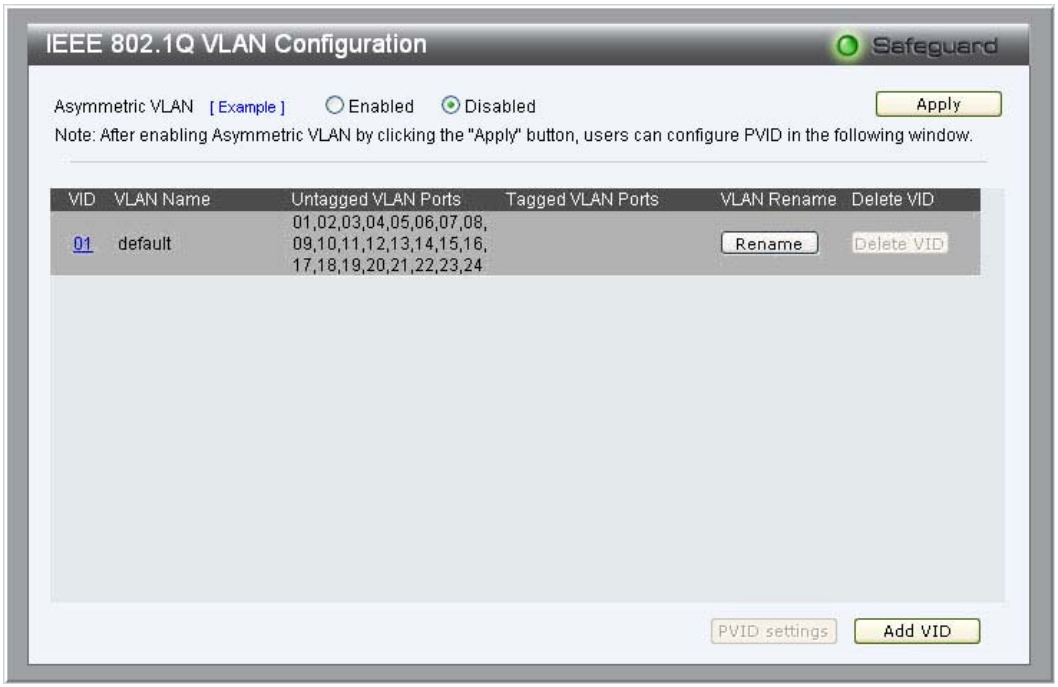


Figure 29 – Configuration > 802.1Q VLAN > Default Setting

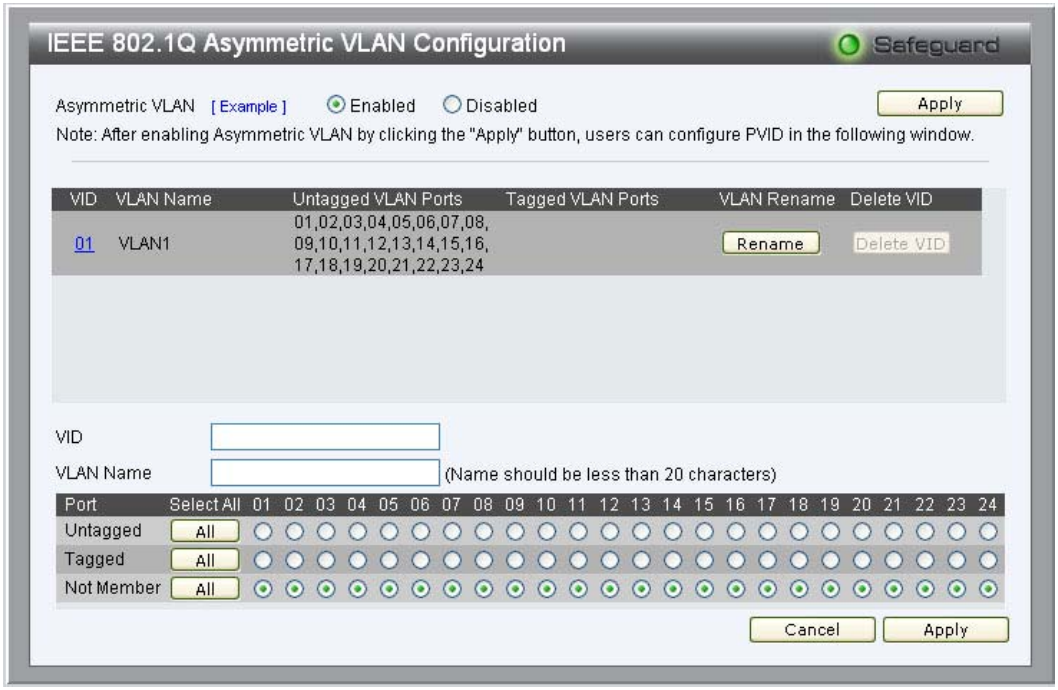

IEEE 802.1Q Asymmetric VLAN Configuration
Safeguard
Asymmetric VLAN [Example] Enabled Disabled
Apply
Note: After enabling Asymmetric VLAN by clicking the "Apply" button, users can configure PVID in the following window.
VID VLAN Name Untagged VLAN Ports Tagged VLAN Ports VLAN Rename Delete VID
01 VLAN1 01,02,03,04,05,06,07,08, 09,10,11,12,13,14,15,16, 17,18,19,20,21,22,23,24
Rename
Delete VID
VID
VLAN Name
(Name should be less than 20 characters)
Port Select All 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Untagged All
Tagged All
Not Member All
Cancel
Apply

Figure 30 – Configuration > 802.1Q VLAN > Add VID

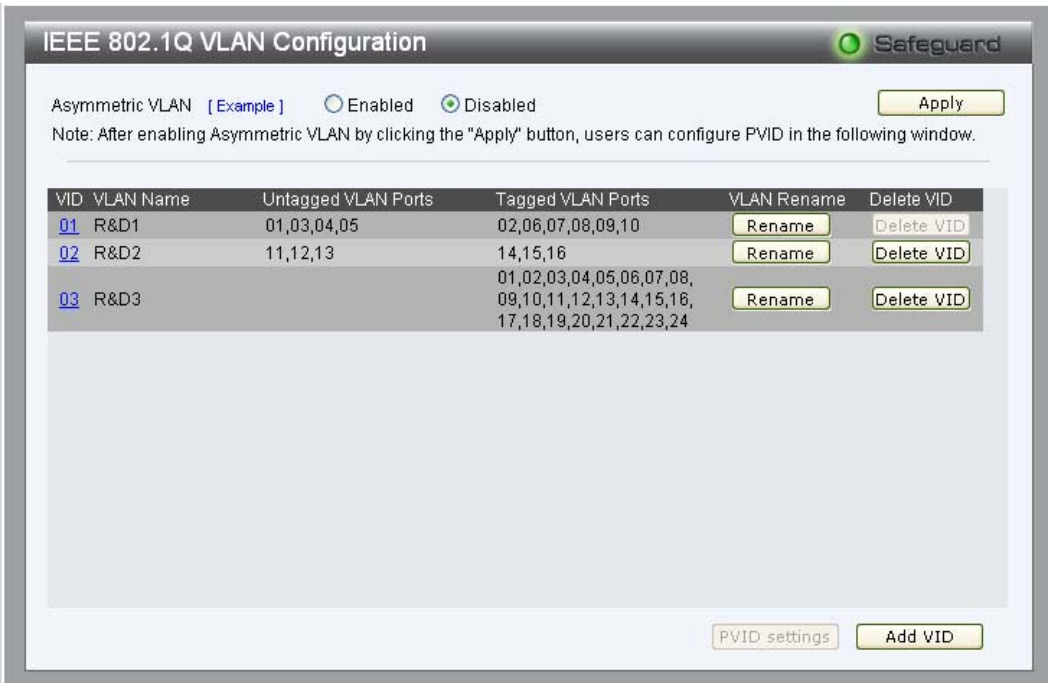

IEEE 802.1Q VLAN Configuration
Safeguard
Asymmetric VLAN [Example] Enabled Disabled
Apply
Note: After enabling Asymmetric VLAN by clicking the "Apply" button, users can configure PVID in the following window.
VID VLAN Name Untagged VLAN Ports Tagged VLAN Ports VLAN Rename Delete VID
01 R&D1 01,03,04,05 02,06,07,08,09,10 Rename Delete VID
02 R&D2 11,12,13 14,15,16 Rename Delete VID
03 R&D3 01,02,03,04,05,06,07,08, 09,10,11,12,13,14,15,16, 17,18,19,20,21,22,23,24 Rename Delete VID
PVID settings
Add VID

Figure 31 – Configuration > 802.1Q VLAN > Example VIDs

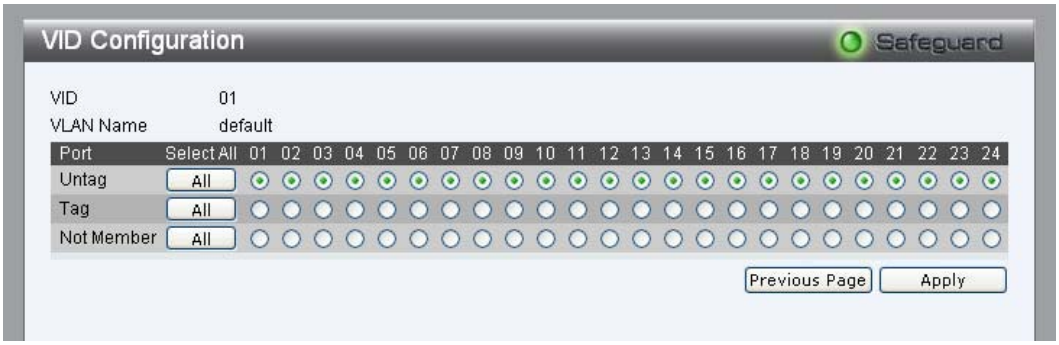

VID Configuration
Safeguard
VID 01
VLAN Name default
Port Select All 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Untag All
Tag All
Not Member All
Previous Page
Apply

Figure 32 – Configuration > 802.1Q VLAN > VID Assignments

Configuration > Asymmetric VLAN

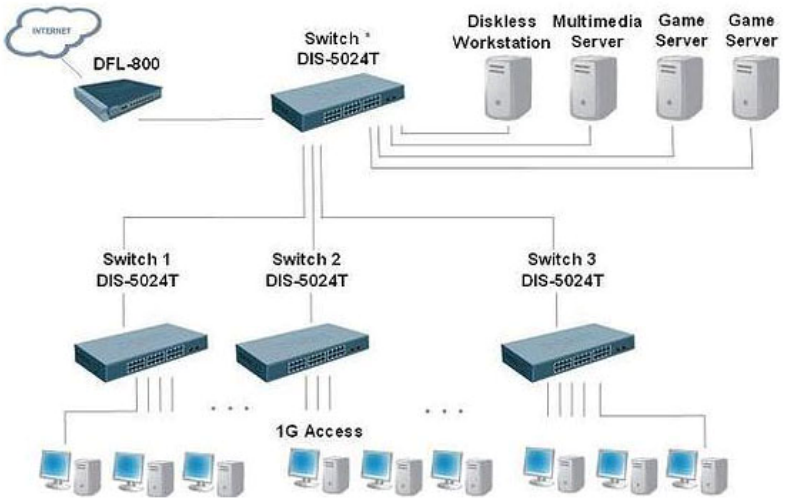
This function located in the 802.1Q Configuration page, it allows devices in different VLANs to communicate with the servers, firewalls or other shared resource in the shared VLAN. This configuration is accomplished through the use of three steps: enabling Asymmetric VLAN, VLAN creation, and PVID setting.

IEEE 802.1Q VLAN Configuration
Safeguard
Asymmetric VLAN [Example] Enabled Disabled
Apply
Note: After enabling Asymmetric VLAN by clicking the "Apply" button, users can configure PVID in the following window.
VID VLAN Name Untagged VLAN Ports Tagged VLAN Ports VLAN Rename Delete VID
01 default 01,02,03,04,05,06,07,08, 09,10,11,12,13,14,15,16, 17,18,19,20,21,22,23,24
Rename
Delete VID

Figure 333 – Configuration > 802.1Q VLAN > Configure Asymmetric VLAN

Click “Example” to open the page and follow the instructions below to configure Asymmetric VLAN

Example for Asymmetric VLANs



The Asymmetric VLAN setting of Switch* is as following.

Device	Port connected to switch*	PVID	VID	Member
Switch 1	5	2	2	5, 15-18, 20
Switch 2	6	3	3	6, 15-18, 20
Switch 3	7	4	4	7, 15-18, 20
⋮	⋮	⋮	⋮	⋮
Servers	15-18	1	1	1 - 24
DFL-800 (Firewall)	20	1	1	1 - 24
Above VIDs are untagged.				

After completing above PVID and VID asymmetric settings, the switch 1/2/3 is incapable of sharing information with each others, and users are able to access shared servers and connect to the internet.

Figure 344 – Configuration > 802.1Q VLAN > Example of Asymmetric VLAN

1. Enable Asymmetric VLAN and click “Apply” button. The overlapping VLAN cannot be configured unless this function is enabled.

2. Configure the VLAN settings. The example above uses ports 15-18 and 20 to hold the servers and firewall to be shared on the network. Therefore, this group of ports is to be included for all VLANs. VLAN 2 is then configured to include ports 15-18, 20 (shared VLAN ports) and the set of ports to be separated from the other subsetted VLANs (port 5). VLAN 3 and 4 are then configured to include the shared ports and the set of ports to be separated from the other subsetted VLANs (port 6 and 7). Therefore we have three VLANs all share ports and have ports that are separated from each other and thus cannot communicate with each other.

3. Configure the PVID setting located in the bottom of VLAN configuration page. The user is to set the shared set of ports as PVID 1, the other separated groups of ports as PVID 2, 3 and 4.

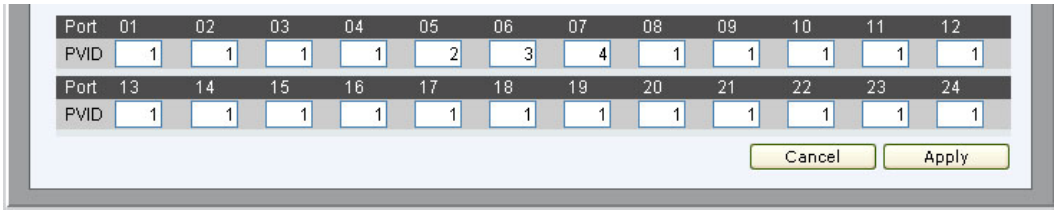


Figure 355 – Configuration > 802.1Q VLAN > Configure PVID

After completing the previous configuration, the user is now able to share the network resources set on the shared group of ports (nominated as PVID 1), with both smaller subsets of VLANs (nominated PVID 2, 3 and 4). Yet, VLAN 2,3 and 4 are incapable of sharing information with each other and the overlapping VLAN configuration has been successfully created.

Configuration > Trunking

The Trunking function enables the cascading of two or more ports for a combined larger bandwidth. Up to six Trunk groups may be created, each supporting up to 8 ports. Add a **Trunking Name** and select the ports to be trunked together, and click **Apply** to activate the selected Trunking groups.

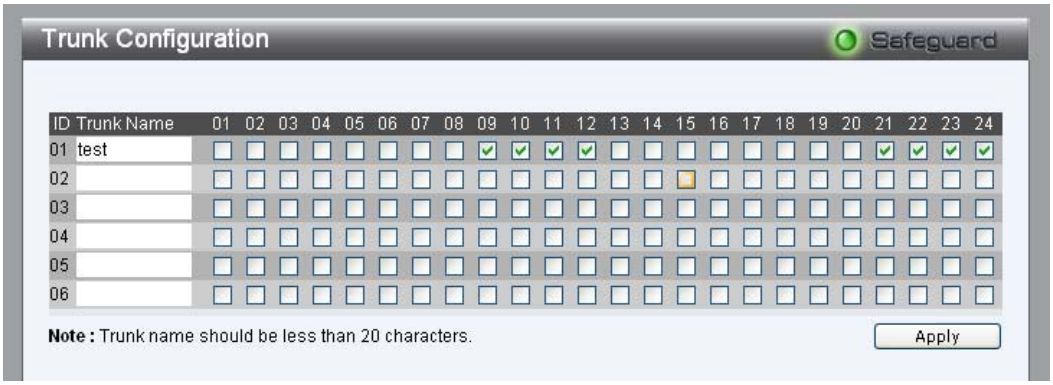

Trunk Configuration
Safeguard
ID Trunk Name 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
01 test
02
03
04
05
06
Note : Trunk name should be less than 20 characters.
Apply

Figure 366 – Configuration > Trunking

NOTE: Each combined trunk port must be connected to devices within the same VLAN group.

Configuration > IGMP Snooping

With Internet Group Management Protocol (IGMP) snooping, the Web-Smart Switch can make intelligent multicast forwarding decisions by examining the contents of each frame's Layer 3 IP header. IGMP snooping can help reduce cluttered traffic on the LAN. With IGMP snooping enabled globally, the Web-Smart Switch will forward IP multicast traffic only to connections that have group members attached.

Figure 377 – Configuration > IGMP Snooping Configuration

By default, IGMP is *Disabled*. If *Enabled*, the IGMP Global Settings will need to be entered:

Query Interval (60-600 sec): The Query Interval is the interval between General Queries sent. By adjusting the Query Interval, the number of IGMP messages can increase or decrease; larger values cause IGMP Queries to be sent less often. Default is 125 seconds.

Max Response Time (10-25 sec): The Max Response Time specifies the maximum allowed time before sending a responding report. Adjusting this setting effects the "leave latency", or the time between the moment the last host leaves a group and when the routing protocol is notified that there are no more members. It also allows adjustments for controlling the frequency of IGMP traffic on a subnet. Default is 10 seconds.

Robustness Variable (1-255 sec): The Robustness Variable allows adjustment for the expected packet loss on a subnet. If a subnet is expected to be lossy, the Robustness Variable may be increased. The Robustness Variable can not be set zero, and SHOULD NOT be one. Default is 2 seconds.

Last Member Query Interval (1-25 sec): The Last Member Query Interval is the Max Response Time inserted into Group-Specific Queries sent in response to Leave Group messages, and is also the amount of time between Group-Specific Query messages. This value may be adjusted to modify the "leave latency" of the network. A reduced value results in reduced time to detect the loss of the last member of a group. Default is 1 second.

Host Timeout (130-1225 sec): This is the interval after which a learnt host port entry will be purged. For each host port learnt, a 'PortPurgeTimer' runs for 'HostPortPurgeInterval'. This timer will be restarted whenever a report message from host is received over that port. If no report messages are received for 'HostPortPurgeInterval' time, the learnt host entry will be purged from the multicast group. Default is 260 seconds.

Router Timeout (60-600 sec): This is the interval after which a learnt router port entry will be purged. For each router port learnt, a 'RouterPortPurgeTimer' runs for 'RouterPortPurgeInterval'. This timer will be restarted whenever a router control message is received over that port. If no router control messages are received for

'RouterPortPurgeInterval' time, the learnt router port entry will be purged. Default is 125 seconds.

Leave Timer (0-25 sec): This is the interval after which a Leave message is forwarded on a port. When a leave message from a host for a group is received, a group-specific query is sent to the port on which the leave message is received. A timer is started with a time interval equal to IgsLeaveProcessInterval. If a report message is received before above timer expires, the Leave message is dropped. Otherwise the Leave message is either forwarded to the port. Default is 1 second.

To enable IGMP snooping for a given VLAN, select *Enable* under **State** then press the *Edit* button under **Static Router Port Setting**, then select the ports to be assigned for IGMP snooping for the VLAN, and press **Apply** for changes to take effect.

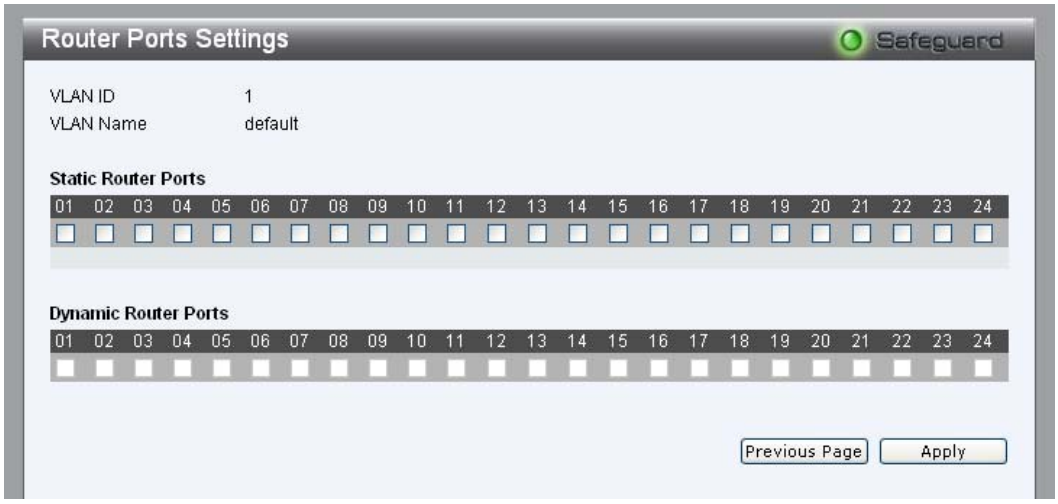

Router Ports Settings
Safeguard
VLAN ID 1
VLAN Name default
Static Router Ports
01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Dynamic Router Ports
01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Previous Page
Apply

Figure 388 – Configuration > IGMP Router port Settings

To view the Multicast Entry Table for a given VLAN, press the **View** button.

Figure 399 – Configuration > IGMP Multicast Entry Table

Configuration > 802.1D Spanning Tree

802.1D Spanning Tree Protocol (STP) implementation is designed to prevent network loops that could cause a broadcast storm. When physical links forming a loop provide redundancy, only a single path will be forwarding frames. If the link fails, STP activates a redundant link automatically.

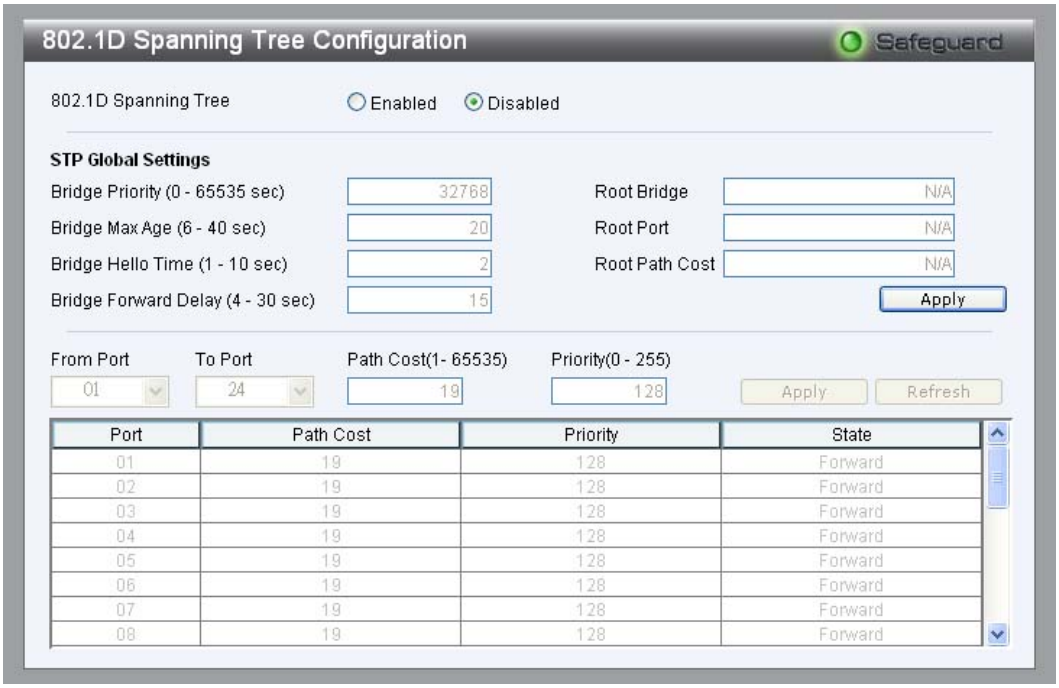


Figure 4040 – Configuration > Spanning Tree

By default, Spanning Tree is *Disabled*. If *Enabled*, the Switch will listen for BPDU packets and its accompanying Hello packet. BPDU packets are sent even if a BPDU packet was not received. Therefore, each link between bridges is sensitive to the status of the link. Ultimately this difference results in faster detection of failed links, and thus faster topology adjustment. A draw-back of 802.1D is this absence of immediate feedback from adjacent bridges.

After *Enabling* STP, setting the STP Global Setting includes the following options:

Bridge Priority: This value between 0 and 65535 specifies the priority for forwarding packets: the lower the value, the higher the priority. The default is 32768.

Bridge Max Age: This value may be set to ensure that old information does not endlessly circulate through redundant paths in the network, preventing the effective propagation of the new information. Set by the Root Bridge, this value will aid in determining that the Switch has spanning tree configuration values consistent with other devices on the bridged LAN. If the value ages out and a BPDU has still not been received from the Root Bridge, the Switch will start sending its own BPDU to all other switches for permission to become the Root Bridge. If it turns out that the Switch has the lowest Bridge Identifier, it will become the Root Bridge. A time interval may be chosen between 6 and 40 seconds. The default value is 20.

Bridge Hello Time: The user may set the time interval between transmissions of configuration messages by the root device, thus stating that the Switch is still functioning. The default is 2 seconds.

Bridge Forward Delay: This sets the maximum amount of time that the root device will wait before changing states. The default is 15 seconds.

Root Bridge: Displays the MAC address of the Root Bridge.

Root port: Displays the root port.

Root Path Cost: Shows the root path cost.

Path Cost: This defines a metric that indicates the relative cost of forwarding packets to specified port list. The lower the number, the greater the probability the port will be chosen to forward packets. The default value is 19.

Path Priority: Select a value between 0 and 255 to specify the priority for a specified port for forwarding packets: the lower the value, the higher the priority. The default is 128.

Configuration > Port Mirroring

Port Mirroring is a method of monitoring network traffic that forwards a copy of each incoming and/or outgoing packet from one port of the Switch to another port where the packet can be studied. This enables network managers to better monitor network performances.

Figure 4141 – Configuration > Port Mirroring

Selection options for the Source Ports are as follows:

TX (transmit) mode: Duplicates the data transmitted from the source port and forwards it to the Target Port.

RX (receive) mode: Duplicates the data that send to the source and forwards it to the Target Port.

Both (transmit and receive) mode: Duplicate both the data transmitted from and data send to the source port, and forwards all the data to the assigned Target Port.

None: Turns off the mirroring of the port.

QoS > 802.1p Default Priority

This feature displays the status Quality of Service priority levels of each port, and for ports that are Untagged, the priority can be adjusted.

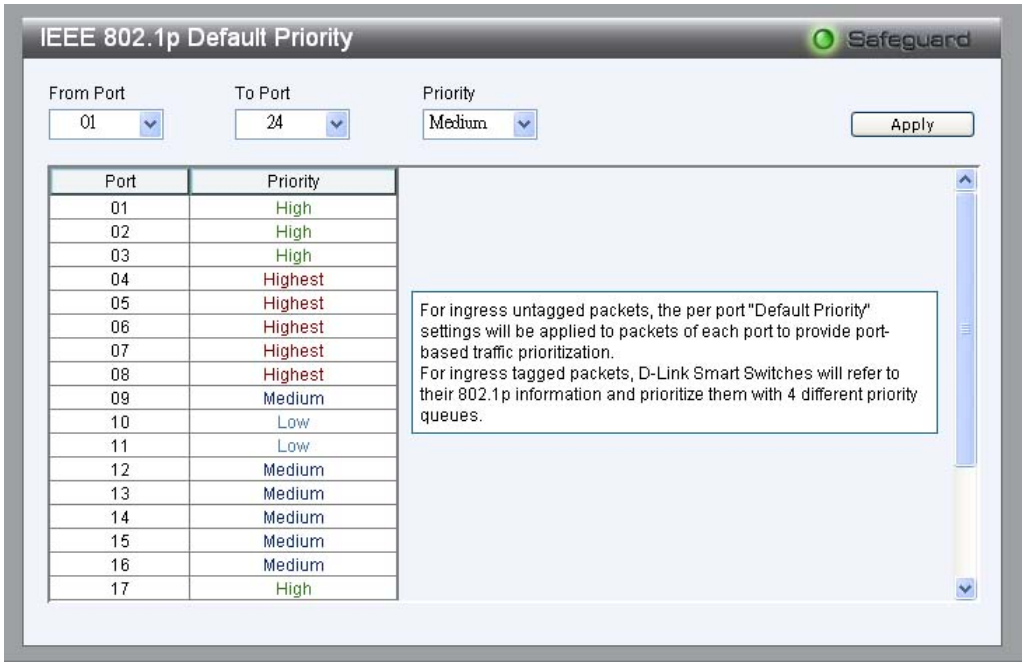


Figure 4242 – QoS > 802.1p Default Priority

Security > Safeguard Engine

By default is *Enabled*, D-Link's **Safeguard Engine** is a robust and innovative technology that automatically throttles the impact of packet flooding into the switch's CPU. This function helps protect the Web-Smart Switch from being interrupted by malicious viruses or worm attacks.

Safeguard Engine
Safeguard
Safeguard Engine:
Enabled
Disabled
Apply
D-Link Safeguard Engine is a robust and innovative technology developed by D-Link, which will automatically throttle the impact of packet flooding into the switch's CPU.
It will keep D-Link Switches better protected from being too frequently interrupted by malicious viruses or worm attacks.

Figure 4343 – Security > Safeguard Engine

Security > Broadcast Storm Control

The Broadcast Storm Control (BSC) feature provides the ability to control the receive rate of broadcasted packets. If *Enabled* (default is *Disabled*), threshold settings of *8,000*; *16,000*; *32,000*; *64,000* bytes per second can be assigned. Press **Apply** for the settings to take effect.

Figure 444 – Security > Broadcast Storm Control

Security > IP-MAC-Port Binding

D-Link DIS-5024T features IP-MAC-Port binding function to mitigate/prevent ARP spoofing attack. ARP spoofing attack is a serious threat for the network environment such as network café, there're several different forms as below:

(1) The attacker may send broadcast ARP packets with a fake IP/MAC addresses of the router to paralyze the whole network. A router or firewall with "Gratuitous ARP" function can prevent it from happening, but DIS-5024T can have better performance than router/firewall on it.

(2) The attacker sends a unicast ARP packet with fake IP/MAC addresses of the router to block a specific PC's network connection. In this case, either router or firewall can not provide a protection against it.

(3) The hacker may combine the attack (2) and forge IP/MAC addresses of other PCs to become a "Man-in-the-middle" attack. The traffic of PCs that are deceived will be intercepted by the hacker.

(4) The hacker forges IP/MAC addresses of a legal user in different places (ports). Without IP-MAC-Port binding, the administrator can not find out where the hacker is.

(5) The attacker uses random source MAC addresses to attack, and the administrator can not locate the source in this case.

By default, IP-MAC Port Binding is *Disabled*. To use IP-MAC-Port Binding for security, select *Enabled* and set following options.

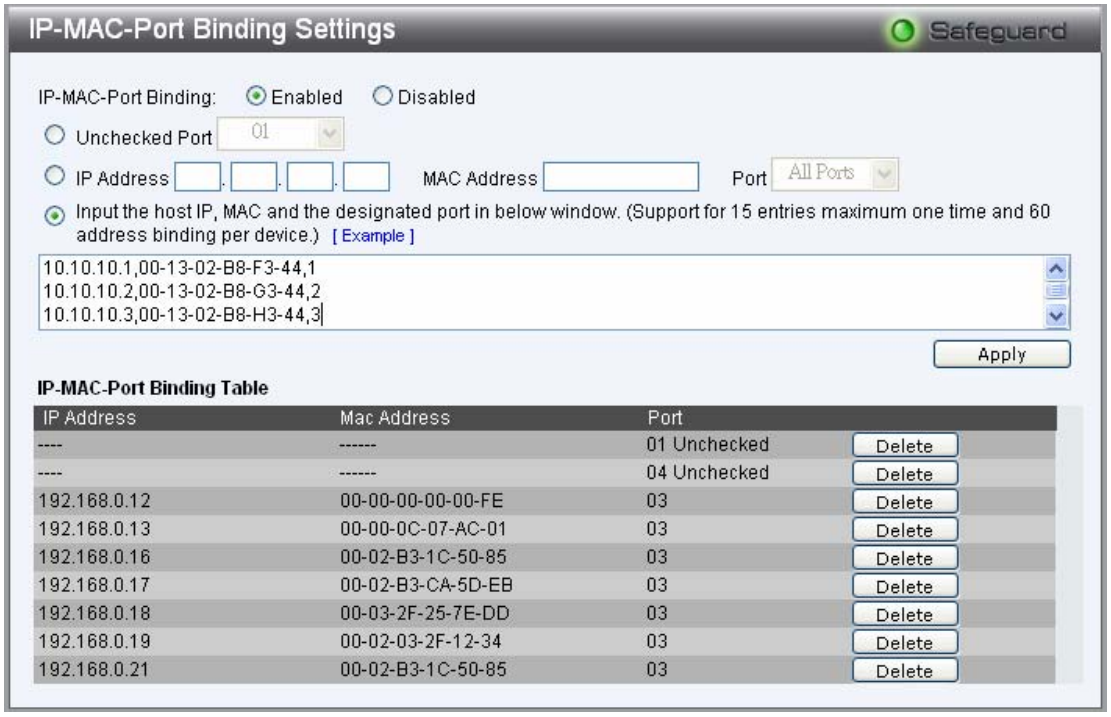

IP-MAC-Port Binding Settings
Safeguard
IP-MAC-Port Binding: Enabled Disabled
Unchecked Port 01
IP Address MAC Address Port All Ports
Input the host IP, MAC and the designated port in below window. (Support for 15 entries maximum one time and 60 address binding per device.) [Example]
10.10.10.1,00-13-02-B8-F3-44,1
10.10.10.2,00-13-02-B8-G3-44,2
10.10.10.3,00-13-02-B8-H3-44,3
Apply
IP-MAC-Port Binding Table
IP Address Mac Address Port
---- ------ 01 Unchecked Delete
---- ------ 04 Unchecked Delete
192.168.0.12 00-00-00-00-00-FE 03 Delete
192.168.0.13 00-00-0C-07-AC-01 03 Delete
192.168.0.16 00-02-B3-1C-50-85 03 Delete
192.168.0.17 00-02-B3-CA-5D-EB 03 Delete
192.168.0.18 00-03-2F-25-7E-DD 03 Delete
192.168.0.19 00-02-03-2F-12-34 03 Delete
192.168.0.21 00-02-B3-1C-50-85 03 Delete

Figure 455 – Security > IP-MAC-Port Binding Setting

Unchecked Port: The unchecked port is the port for switch to connect the router (uplink) and IP-MAC-Port binding will not apply to this port.

DIS-5024T provides two methods to input the entry:

(i). Manual Input: Enter the IP address, MAC address, and the port(s) manually, then click “Apply” to establish the database.

(ii) If the user has a predefined text file, he can easily use copy & paste to enter the data. Click “Apply” when done.

User can click “**Example**” to open the page below for reference.

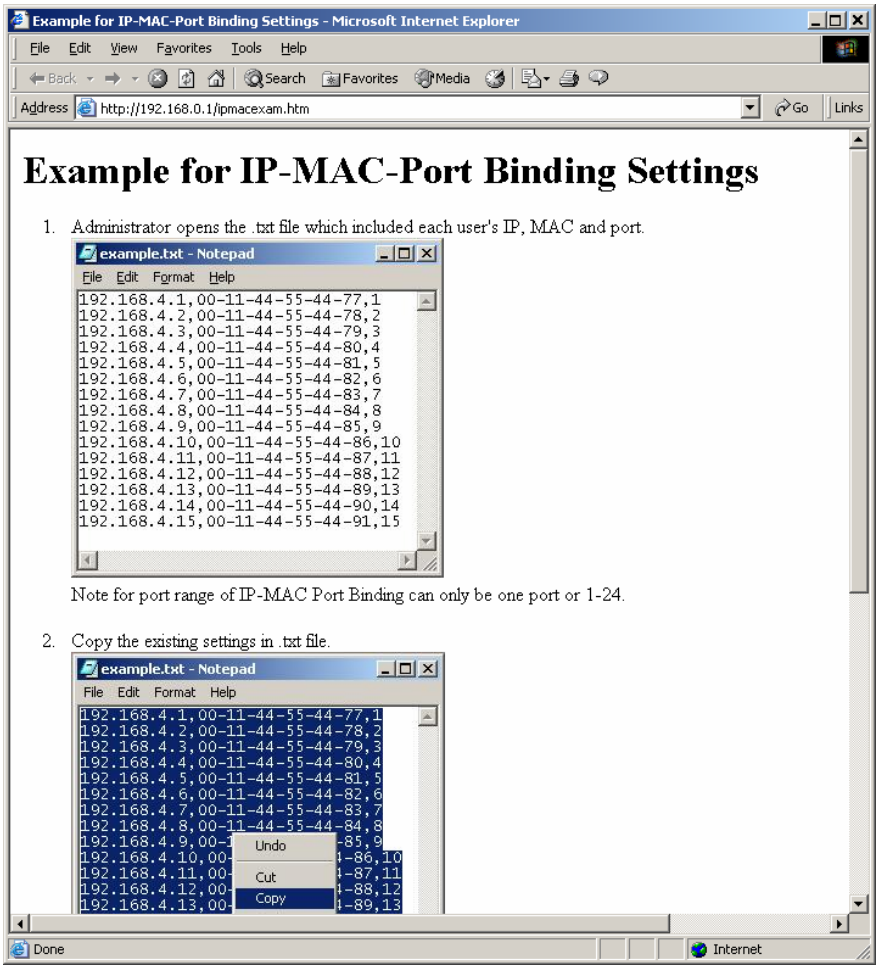


Figure 466 – Security > Example fir IP-MAC-Port Binding Settings

Note: Support for 15 entries maximum one time and 60 address binding per device.

To Delete an entry, just click “**Delete**” button in the end of the data.

Security > 802.1X Setting

IEEE-802.1X provides a security standard for network access control, predominantly in Wi-Fi wireless networks. 802.1X holds a network port disconnected until authentication is completed. Depending on the results, the port is either made available to the user, or the user is denied access to the network. 802.1X uses the Extensible Authentication Protocol (EAP) for passing authentication messages.

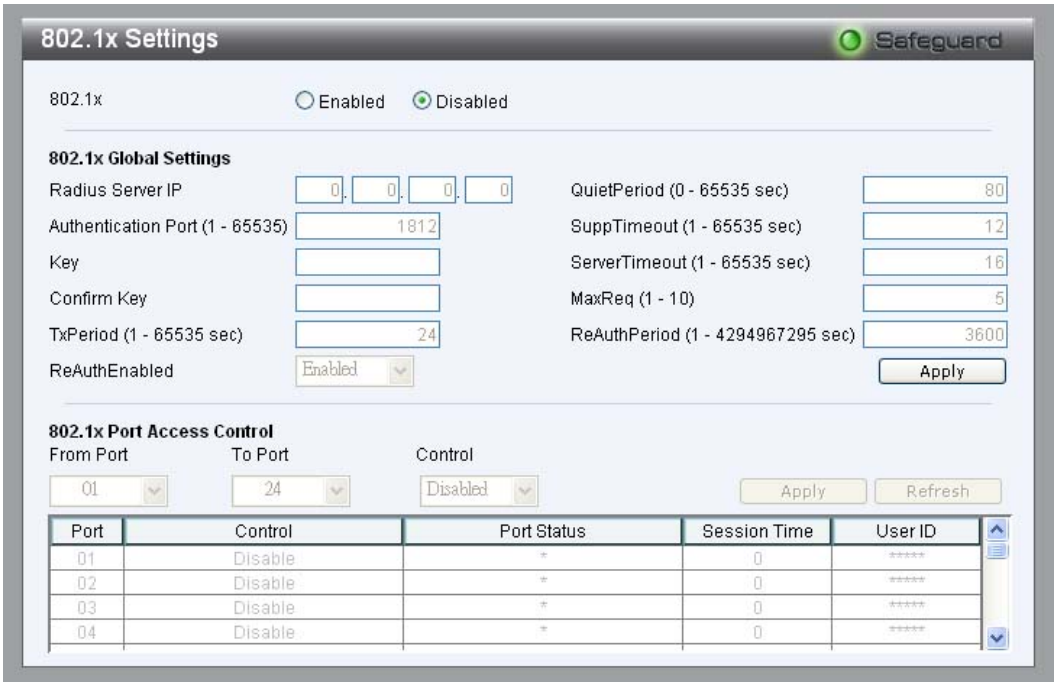


Figure 477 – QoS > 802.1X Setting

By default, 802.1X is *Disabled*. To use EAP for security, select *Enabled* and set the 802.1X **Global Settings** for the Radius Server and applicable authentication information.

Authentication Port: sets primary port for security monitoring. Default is 1812.

Key: Masked password matching the Radius Server Key.

Confirm Key: Enter the Key a second time for confirmation.

TxPeriod: Sets the number of seconds that the switch waits for a response to an EAP-request/identity frame from the client before retransmitting the request. Default is 24 seconds.

ReAuthEnabled: This *Enables* or *Disables* the periodic ReAuthentication control. When the 802.1X function is *Enabled*, the ReAuthEnabled function is by default also *Enabled*.

QuietPeriod: Sets the number of seconds that the switch remains in the quiet state following a failed authentication exchange with the client. Default 80 seconds

SuppTimeout: Sets the switch-to-client retransmission time for the EAP-request frame. Default is 12 seconds.

ServerTimeout: Sets the amount of time the switch waits for a response from the client before resending the response to the authentication server. Default is 16 seconds.

MaxReq: This parameter specifies the maximum number of times that the switch retransmits an EAP Request packet to the client before it times out the authentication session. Default is 5 times.

ReAuthPeriod: This command affects the behavior of the switch only if periodic re-authentication is enabled. Default is 3600.

To establish 802.1X port-specific assignments, select the **From** and **To Ports** and select *Enable*.

Security > Mac Address Table > Static MAC

This page provides two distinct features. The top table provides the ability to turn off auto learning Mac address if a port isn't connected to an uplink Switch (i.e. DHCP Server). By default, this feature is *OFF* (disabled).

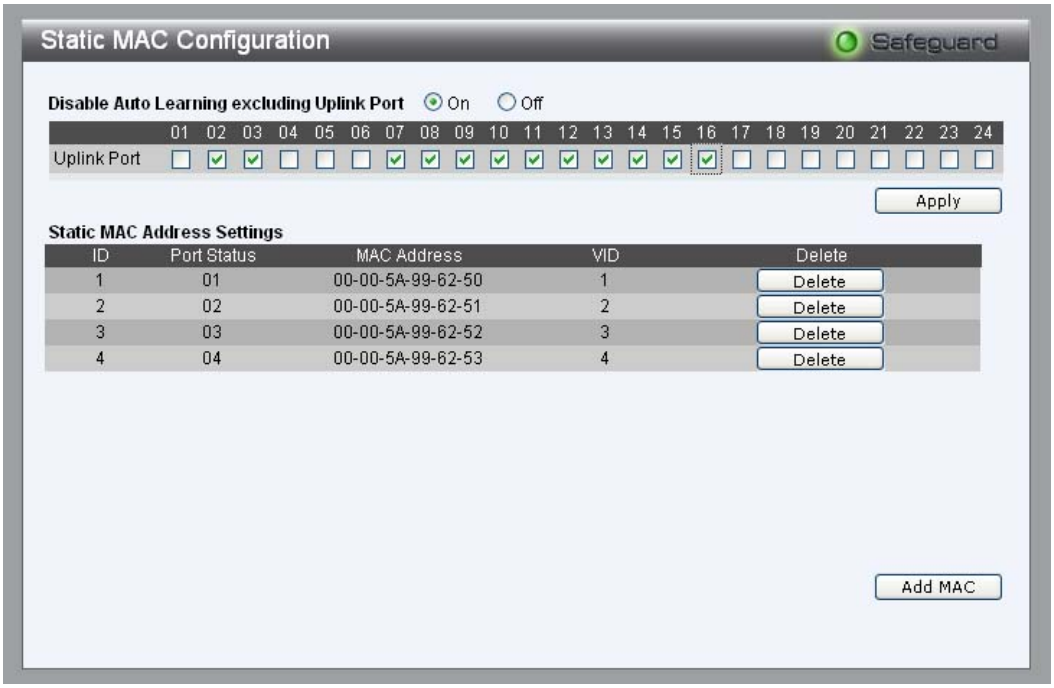


Figure 488 – Security > Static Mac Address

To initiate the removal of auto-learning for any of the uplink ports, press *On* to enable this feature, and select the port(s) for auto learning to be disabled.

The **Static Mac Address Setting** table displays the static Mac addresses connected, as well as the VID. Press **Delete** to remove a device. To add a new Mac address assignment, press **Add Mac**, then select the assigned Port number, enter both the Mac Address and VID and press **Apply**.

Security > Mac Address Table > Dynamic Forwarding Table

For each port, this table displays the Mac address of each packet passing through the Switch. To add a Mac address to the Static Mac Address List, click the **Add** checkbox associated with the identified packet.

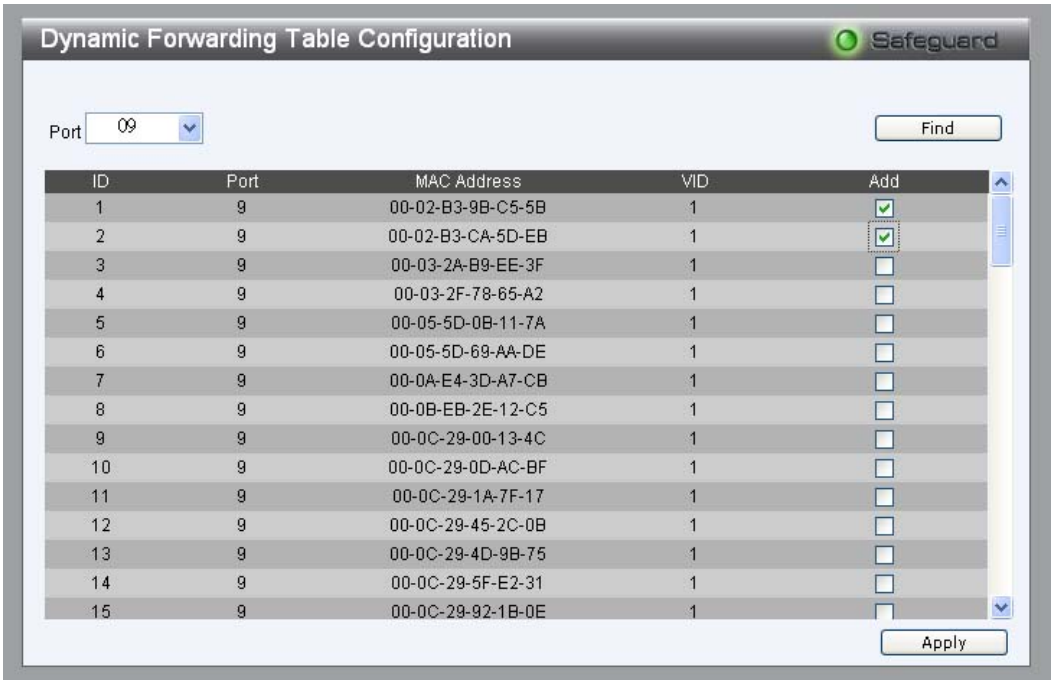


Figure 499 – Security > Dynamic Forwarding Table

Monitoring > Statistics

The Statistics screen displays the status of each port packet count.

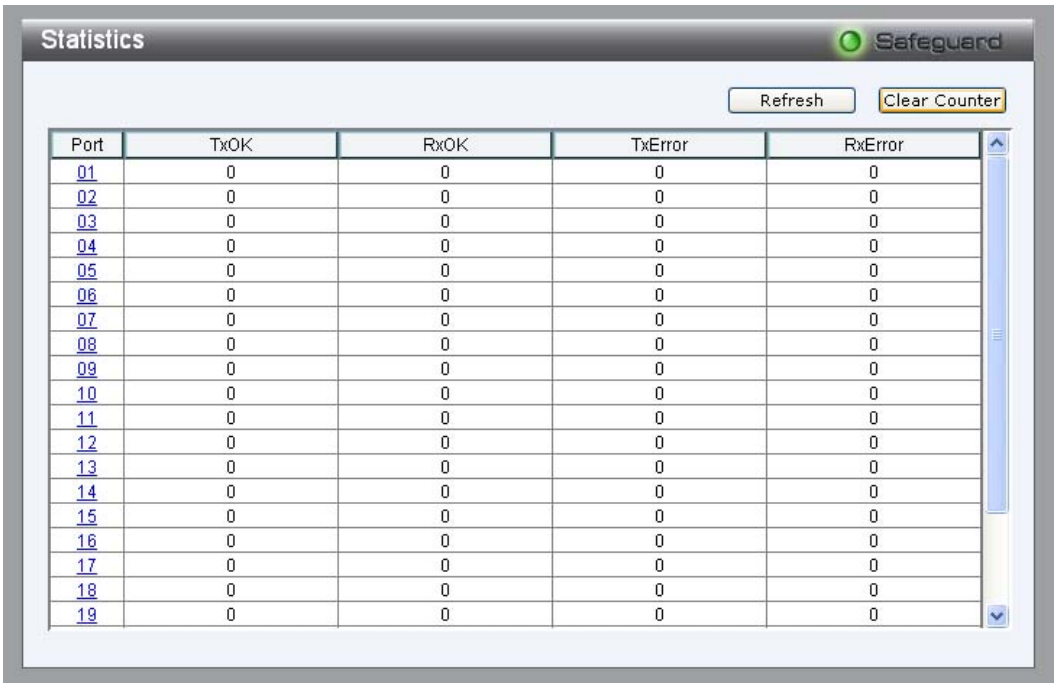


Figure 5050 – Monitoring > Statistics

Refresh: To renew the details collected and displayed.

Clear Counter: To reset the details displayed.

TxOK: Number of packets transmitted successfully.

RxOK: Number of packets received successfully.

TxError: Number of transmitted packets resulting in error.

RxError: Number of received packets resulting in error.

To view the statistics of individual ports, click one of the linked Port numbers for details.

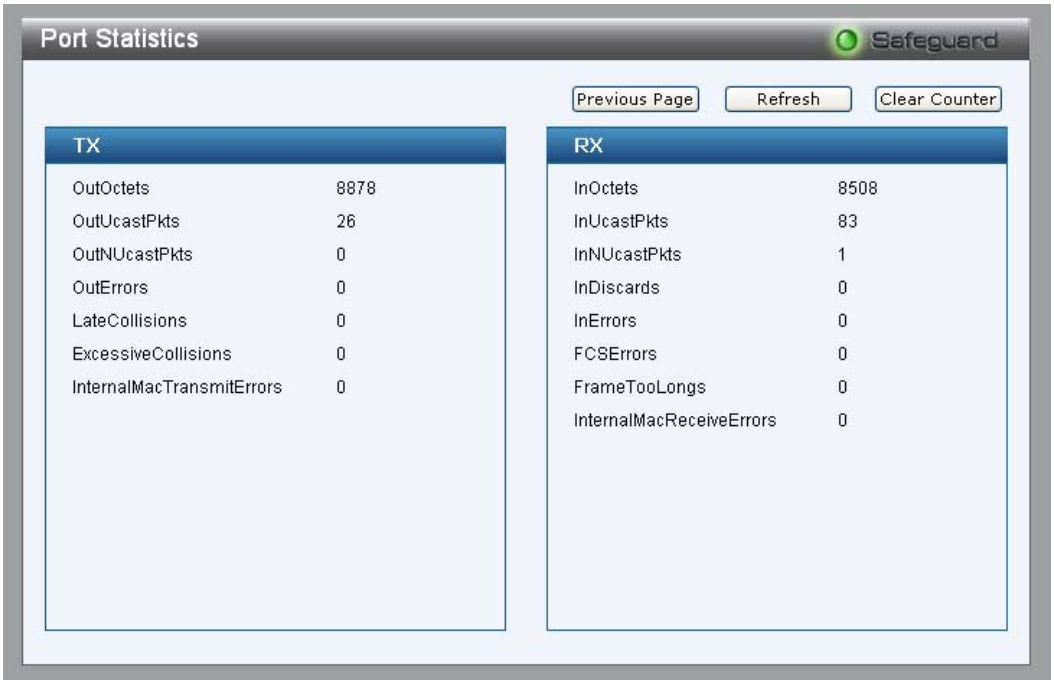


Figure 5151 – Monitoring > Port Statistics